



FRIDAY, JULY 17.

CONTENTS.

	PAGE.
ILLUSTRATIONS :	
Sheffield Pressed Steel Hand-Car Wheel	491
Driving Park Avenue Bridge, Rochester, N. Y.	491
Barr's Vestibule Chicago, Milwaukee & St. Paul Ry.	494
Continuous Rail Joint	494
Carrier Iron for Freight-Car Drawbars	495
Link Planer	495
Grove Spark Ejector	496
Swiss Bridge Disaster	497
CONTRIBUTIONS :	
A Balky Compound	491
The C. B. & Q.	491
Vermont and New Hampshire Railroad Projects	491
EDITORIALS :	
Injector Check Attachments to Locomotive Boilers	498
The Latest Sacrifice to the Time-Interval System	498
Standards in Freight-Car Construction	499
GENERAL NEWS :	
Locomotive Building	503
Car Building	503
Bridge Building	503
Meetings and Announcements	504
PERSONAL	504
Elections and Appointments	504
Railroad Construction	505
General Railroad News	506
Traffic	506
MISCELLANEOUS :	
Technical	502
The Scrap Heap	503
Railroad Law	503
Madison Car Works	503
The Ravenna Disaster	494
Foreign Notes	495
Utilization of the Power of the Niagara Falls	501

Contributions.

A Balky Compound.

TO THE EDITOR OF THE RAILROAD GAZETTE:
I have just observed a peculiar action of a compound locomotive which delayed a fast train about five minutes at starting, and I send you an account of the incident, as it may throw some light upon the intercepting valve discussion.

The locomotive was a two-cylinder compound with an intercepting valve. The engineer tried all means to start ahead with the low-pressure cranks on the quarter, but the wheels would only turn until the low-pressure cranks were near the dead points, and then the engine would stop. As this position of cranks is one at which the intercepting valve is not generally supposed to be of much value, the starting being done almost entirely by the low-pressure cylinder, it at first seemed strange that the engine did not start, but a further examination showed the cause of the trouble. It was that there was so much leak into the receiver that the high-pressure piston could not keep up the motion already started by the low-pressure piston, as the intercepting valve had opened because of the leak and the receiver pressure acted against the back of the high-pressure piston. The effect was just the same as if no intercepting valve had been used. The train was finally started by backing up hard and gaining the assistance of the buffer springs to get the first half revolution of the drivers. This goes to show that the intercepting valve must leak but little steam during a considerable period of time, and that if it or the high-pressure piston or valve leaks the intercepting valve is rendered useless.

I would like to hear from some of your readers who have been discussing this matter lately, their opinion as to the significance of the failure to start with a comparatively new engine.

COMPOUND.

The C. B. & Q.

NEW YORK, July 13, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The articles on the history and prospects of the Chicago, Burlington & Quincy road which the New York *Times* published on two successive Sundays were very cleverly written, as the *Times* articles usually are. They contained facts which most of us knew before, though put in an entertaining way, and were accompanied by a bear raid on the stock in Wall street. Indeed the connection between the two seemed so close that several newspapers unhesitatingly assumed that there had been collusion. But whatever the motive, all I intend to do in this letter is to mention briefly the circumstances of the road as thus discussed.

A table giving the increase in mileage of the Burlington system for five or ten years, accompanied by the decrease in gross and net earnings and the increase in fixed charges, is striking, and would be equally so for a majority of Western roads. Such a table is most effective without much comment, for, as one of the characters in Sheridan's "Rivals" says of a quarrel, "to explain it would be to spoil it." That is to say, a certain dropping of Western railroad profits to the basis of the Eastern trunk lines is to be expected and really means nothing against the management. Prognostications of a continuing decline until dividends are gone and even fixed charges imperiled, are to be received with great caution. Again, the *Times* was very happy in dubbing the extensions of the Burlington "sage brush lines." No doubt a part—and not a small part either—of the implied censure is deserved. As the *Evening Post* observed not long ago on the same subject, it is useless for President Perkins in his annual reports

to "shout" long and loud about the damages which the Interstate Commerce Law has done to his revenues, when one has only to take down his Official Guide, turn to the Burlington map and point out the lines of the company recently built through the arid regions, in order to turn the laugh upon the Burlington. Yet here, too, it should be remembered that the policy of all American roads must look to the future. The Burlington—a little more than was wise, perhaps—has but followed out its "destiny" as the officers understood it. The road was caught in the present financial stringency with its plans half developed. If the corn crop comes out as well as is now expected, and if the present rather depressed state of trade should next year give place to the oil activity west of the Missouri, the Burlington can easily continue to pay small dividends. But if business should not revive the Burlington would be hard put to it; but so would all other Western roads. It is in favor of the Burlington that its old lines are well located and serve active and important trade centers and sections.

In conclusion let me remark that the days of great fluctuations in Wall street because of sensational reports about railroads are gone by. The only thing that tells now-a-days is the truth, without bias.

ARGUS.

Vermont and New Hampshire Railroad Projects.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The rumors of a project on the part of the Canadian Pacific and Boston & Maine for shortening the distance between Montreal and Boston are looked upon by many who have followed the course of railroad events in that

pelier & Wells River, and utilize the latter to Woodsville, which would have amounted to much the same thing as is now contemplated. When the Lowell was leased to the Maine and the latter acquired the Passumpsic, this idea was given up.

Taken in connection with the reported projects of the Canadian Pacific and Boston & Maine, it is noteworthy that the Grand Trunk-Central Vermont line has just put on two fast vestibuled express trains via Rutland, Bellows Falls and the Fitchburg, which make two hours' quicker time than is made via White River Junction, and since the acquisition of the Rutland road by the Central Vermont the management have been systematically and rapidly putting it in first-class condition, and are now diverting a large amount of freight from their main line to the Rutland, and sending it via Bellows Falls and Fitchburg.

Returning to New Hampshire, the Concord & Montreal is building an extension of its Whitefield & Jefferson division to Berlin in order to reach the Rangeley Lake region, and is soon to commence the building of an extension of the Pemigewasset Valley division from North Woodstock, 10 miles, to a connection with the Profile & Franconia division at Profile House. The latter is to be made standard gauge to Bethlehem Junction, thus giving a new and very direct line from Concord to Bethlehem, some 30 miles shorter than the present line of the same company via Woodsville, and in addition opening up some of the most attractive scenery of the White Mountains. This will make the mileage from Boston to Fabyan's about 175 miles, against 207 miles via the Boston & Maine.

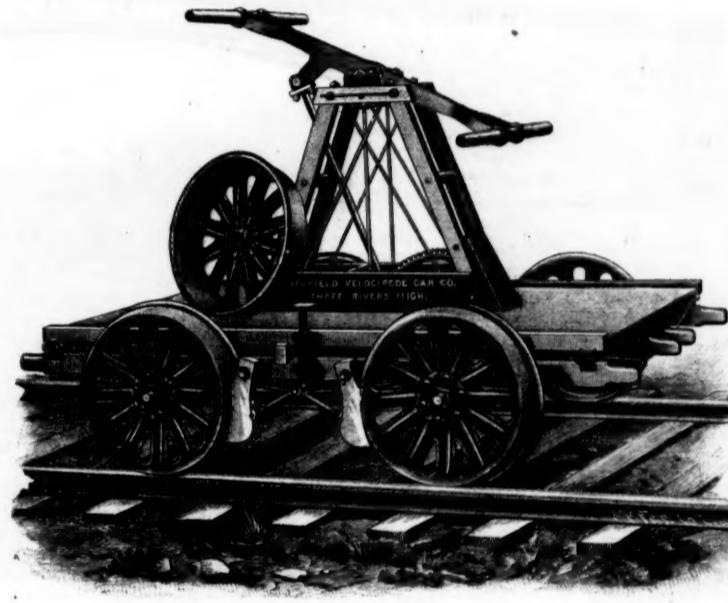


Fig. 2.

THE SHEFFIELD PRESSED STEEL HAND-CAR WHEEL.

part of New England for the past three years as "straws," indicating that the old fight is to be vigorously renewed and that the Boston & Maine is determined to "pocket" the Concord in retaliation for that road's determined opposition to the acquisition by the Concord of the Boston, Concord & Montreal property. It was freely predicted at the time the Concord won in that somewhat famous litigation that the B. & M. would "bile its time" and sooner or later seek revenge. Immediately after the transfer of the Boston, Concord & Montreal to the Concord, the B. & M. paralleled the line from Fabyan's to Lancaster, N. H., and by the acquisition of the newly constructed Upper Coös road was able to deprive the Concord of a large share of the traffic from that section. It had already secured the Passumpsic, and when it secured control of the Northern, notwithstanding the determined opposition of the Concord, it was able to reach Concord from the north without using a mile of Concord & Montreal track. There is now needed only the construction of a parallel line from Concord to Manchester, 35 miles, to enable the B. & M. to completely parallel the whole Concord & Montreal system.

Just what deal has been arranged for the use of the old roadbed from Rouse's Point to Swanton, Vt., is not given out, and inasmuch as the new line will crowd the Grand Trunk pretty hard, some opposition may be felt from the Central Vermont. Should, however, the possible consolidation of the Grand Trunk and Canadian Pacific take place, which is expected by many as likely to happen in the near future, there would be no opposition from that source and the connection at Rouse's Point would be much simplified.

At the time the Boston & Lowell controlled the St. Johnsbury road and the Boston, Concord & Montreal there was a project to build a cut-off from Hardwick, Vt., on the St. Johnsbury, to Marshfield, Vt., on the Mont-

The outcome of this triangular warfare will be looked for with considerable interest by those who are familiar with its past history.

P. B. C.

A Pressed Steel Hand-Car Wheel.

Pressed steel for light flanged and plain wheels has several advantages, as illustrated by the accompanying cut of a new wheel now being introduced by the Sheffield Velocipede Car Co., of Three Rivers, Mich. The weight of the ordinary wheel for hand-car service varies from 55 to 90 lbs., while this wheel, which is fully as strong, if not stronger, weighs but 35 lbs. In a hot climate there is nothing to shrink or decay as in wooden and composite wheels, and as only the best class of steel can be used for die work, there is therefore a certainty as to the value of the material in the wheel. These wheels are not easily made, and as with other pressed steel work, considerable experience is needed to make them cheaply and without fracture. It is needless to say that for hand cars and velocipedes lightness is an essential requirement, and as a large part of the weight of such vehicles is in the wheels, a lighter wheel than the common form is very desirable.

The plates in the wheel are from $\frac{1}{8}$ to $\frac{3}{16}$ in. in thickness, according to the service. The plate from which it is made is circular, and corrugations are added to increase the strength. After pressing, the material between the corrugations is cut away to decrease the weight, and the wheel then has the appearance of a spoke wheel. The hub is of drop forged steel riveted to the plate. Fig. 1 shows a section of the wheel, and fig. 2 the wheel in position on a hand car.



Fig. 1.

Driving Park Avenue Bridge, Rochester, N. Y.

This bridge crosses the Genesee River, in the city of Rochester, about six or seven hundred feet northward from the Lower Falls, and forms the connection of Driving Park avenue on the west side of the river with Avenue E on the east side.

The river here flows through a very picturesque gorge which it has excavated for itself. The material forming the sides of this gorge is of stratified rock nearly horizontal. The lower portion, from some point below the surface of low water, is of red sandstone to a height of about 100 ft. above the surface of the water. On top of this a stratum of nearly white sandstone, about 3 ft. thick, then a stratum of blue limestone shale about 15 ft. thick. Over the shale the formation consists of thin strata of blue limestone somewhat broken. The top of this blue limestone on the west side is about 132 ft. above the surface of the water, and forms on that side a bench covered with soil, slightly rising to a point 100 ft. back from the brink of the gorge, and from thence the earth rises with a slope of about 35 degrees to the grade of Driving Park avenue at an elevation above the water of 202.58 ft. On the east side the limestone continues to the height of 194 ft. above the water and is covered with about 12 ft. of earth. Grade on this

exposure. Each skewback pedestal is capped with a single block of granite 6' 0" x 6' 0" x 2' 0". On these are bedded, with rust joints, the wrought-iron skewbacks of the arch.

The floor of the bridge consists of an iron framework of riveted plate and angle beams and stringers covered with planking. The beams rest across the upper chords at the panel points, and have their ends projecting at each side, to support the sidewalks.

The ends of the stringers are riveted to the webs of the beams. The carriage-way, 20 ft. wide, is planked with 3½ in. white oak. The sidewalks, each 7 ft. 6 in. wide, are planked with 2½ in. white pine. At the outer edge of each sidewalk is a substantial iron hand rail 3 ft. 7 in. high and secured to the iron work of the floor. The floor is designed to sustain a live load of 100 lbs. per square foot, or of a 10-ton road roller on any part of the carriage-way. The arch is designed for a live load of 90 lbs. per square foot of floor and sidewalks and the approach spans for 100 lbs. per square foot.

The original intention of the design was to allow of the arch being erected without scaffolding. This could be accomplished by erecting the approach spans on a scaffolding, securing their shore ends to temporary anchorage on the banks, and then build the arch out from each side till

gravings which have been prepared by the *Engineering Record*.

Fig. 20 is an elevation partly in section, showing detail of the skewback connection. Fig. 21 is an elevation at *XX*, fig. 20, omitting the pedestal *C* and eye bars at *D*. Fig. 22 is an elevation at *VV*, fig. 20. Fig. 23 is an elevation at *ZZ*, fig. 20, omitting the pedestal *C*. Fig. 24 is an elevation at *WW*, fig. 21.

The arch lower chord section is flattened and widened by diaphragms and re-enforcing plates and angles that change its width from 2 to 4 ft. and its depth from 30 to 18 in. A hollow steel casting *A* is riveted to the lower end, upon which it butts with a planed joint. The casting *A* receives one-half of the closely fitting steel pin bearing, shown in fig. 26; the other half is bolted to the pedestal *C*, and they are separated about ½ in. by the 3½-in. steel skewback pin. *D* is a cast-steel lug receiving the lateral system eyebars.

Fig. 25 is a diagram of the shape and relative positions of the diaphragm plates. Fig. 29 is an elevation of the crown hinge. Fig. 30 is an elevation from *XX*, fig. 29, of the vertical post *P*.

Fig. 28 is a plan from *ZZ*, fig. 29, with inclined post *I* removed for clearness. Fig. 27 is an elevation from *VV*, fig. 29. Fig. 32 is an elevation at *XX*, fig. 29,



DRIVING PARK AVENUE BRIDGE, ROCHESTER, NEW YORK.

By L. L. BUCK, M. Am. Soc. C. E.

side is 3.42 ft. higher than on the west side. The sides of the gorge are precipitous to a height of 132 ft. on the west side, and, at the site of the bridge, 150 ft. on the east side, from which level the surface has a slope of about 40 degrees to grade. The width of this steep gorge on the axis of the bridge is 410 ft.

The main arch which spans this gorge has a length of 428 ft. and a versed sine of 67 ft. It is braced in the spandrels by a system of vertical posts, longitudinal upper chords and diagonal braces. The ribs are hinged at the middle and at each skewback. All other joints are riveted. The trusses thus formed (two in number) are so battered that with a width between centres of 20 ft. at upper chords, the width between centres at skewback pins is 46 ft. To connect the floor of the arch with the shore on the west side are two riveted lattice spans. One of these spans has an end hinged to the end of the upper chord of the arch. Its other end, and the end of the other span adjacent to it, are both hinged to a rocking bent supported on a pedestal founded on the rock of the bench. The end at the abutment rests on sliding seats. On the east side, the approach is a single span hinged to the end of the upper chord of the arch and resting on sliding seats at the abutment.

The thick stratum of shale, with the exception of a few inches of the exposed edge, is compact and tough. It is perfectly reliable where there is no chance of its becoming exposed to air and frost. Three of the foundations of the arch were formed in this shale by excavating backward and downward to a distance of 12 to 15 ft., and then filling the pits with a strong beton composed of Portland cement mortar and broken stone, and surmounting this with four courses of ashlar masonry, inclined so as to be at a right angle to the line of thrust of the arch.

The southeast foundation was carried backward and downward into the sandstone, for the reason that the contour of the bank on this side makes such an angle with the bridge axis that the shale would be liable to

the two halves met in the middle, after which the anchorage would be detached.

The contract for the bridge was awarded to the Rochester Bridge & Iron Works in March, 1889. The contract included the erection, and as the contractor was held responsible for its safety till completed, it was optional with him to use scaffolding for erecting the arch if he so desired. He preferred that method and designed the scaffolding that was used.

The year 1889 being very wet the water of the Genesee was very high all through the summer. This caused a vast amount of spray from the falls. Much of this spray falling at the site of the bridge delayed the work on the permanent foundations, as well as on the scaffolding, to so late a date that it was evident that the erection of the arch could not be completed before freezing weather, when the ice would form so rapidly on the scaffolding as to render it practically impossible to prosecute the work till the return of spring. To avoid the risk of having to leave the partially completed iron work on the scaffolding in so critical a condition, it was decided to suspend the work till warm weather. The work was then resumed, and was completed in time to be opened to traffic in the presence of the Mayor and Common Council, Dec. 1, 1889.

In closing, I take pleasure in testifying to the faithful manner in which the Rochester Bridge & Iron Works executed its contract on this work in every respect. The erection, superintended by Mr. J. J. Blake, was creditably executed.

My assistant on the work was Mr. H. D. Robinson, who inspected the work in the shops and at the bridge site. He also did a large part of the instrumental work of locating the foundations of the permanent structure, as well as those of the scaffolding; all of which was performed with the required accuracy.

L. L. BUCK, Engineer.
To the description given by Mr. Buck above we add the following notes, explanatory of certain details of en-

omitting vertical post *P* and inclined post *I*. Fig. 33 is a corresponding elevation of the other, or left-hand, truss. The chord section is changed here in a manner similar to that described for the skewback, and a steel pin bearing casting *N*, fig. 31, is riveted to each of the four middle-chord sections, with sufficient clearance to admit temperature adjustment about the pin shown in fig. 31.

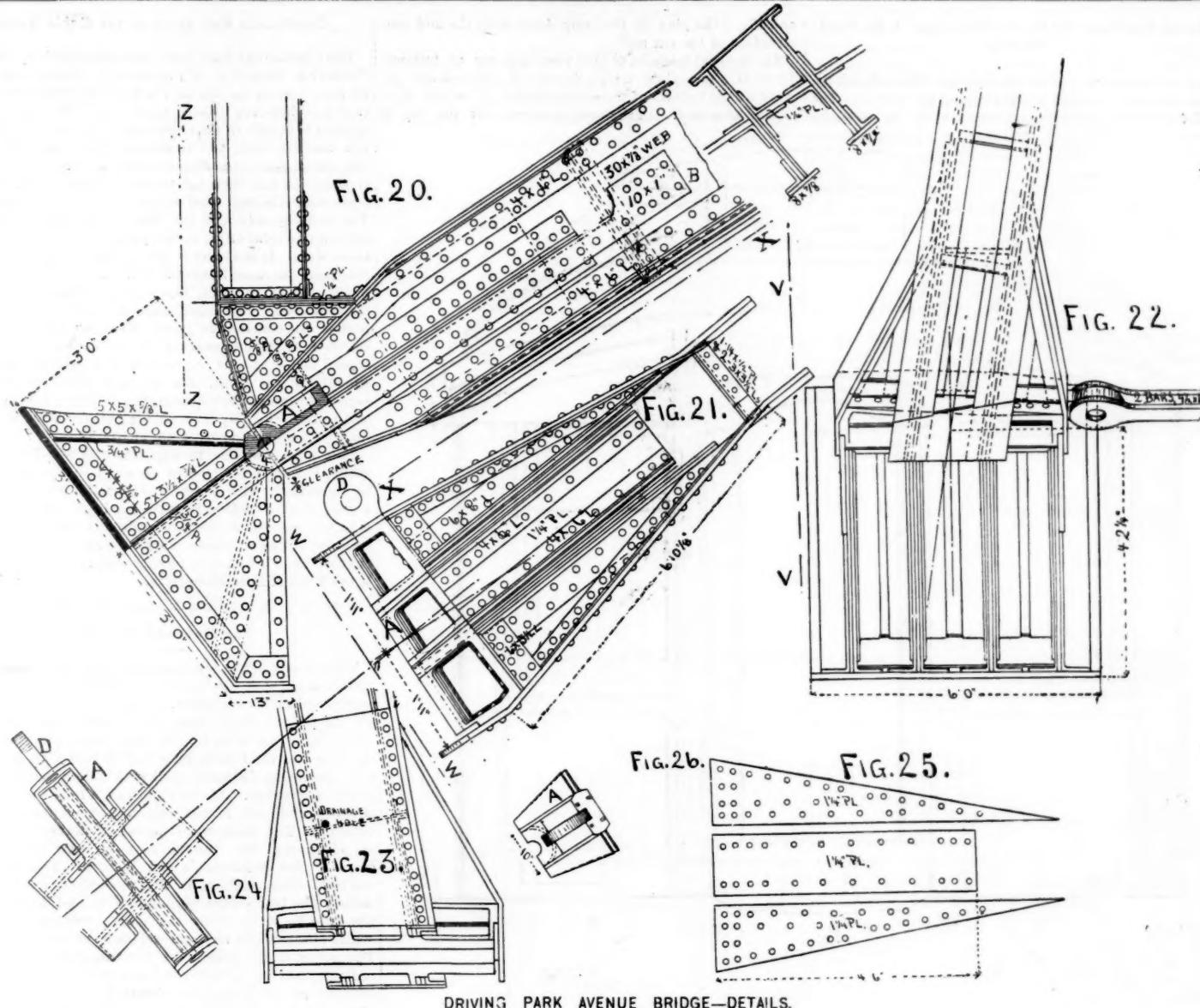
The Madison Car Works.

Considerable attention is being attracted among railroad men by this enterprise, which is backed largely by St. Louis capital. The plant is situated on the east side of the Mississippi, about 4 miles north of the old (Eads) bridge, and at the foot of the east approach to the new Merchants' bridge. The Madison Car Works property consists of some 46 acres a little over a mile back from the river.

First is the foundry, 125 x 552 ft., with two cupola wings about 70 ft. long each, the south one containing two 70-in. cupolas for melting iron for wheels, the other cupola being 78 in., and used for iron for small ordinary castings.

At the wheel end of the foundry are 160 wheel annealing pits. The Whiting trolley system, built at Detroit, is used for handling wheels from the floor to these pits, a cross-running carrier being used also at the pit side. A good sized core oven for this class of work is at the extreme end. The rattlers are placed near the centre of the building, between the wheel floor and the soft iron work, beyond which latter are the usual core ovens. Circular jib cranes are provided for handling the ladles and heavy material at this end. The system here used for raising the coke to the charging floors for the cupolas is that of pockets or strips drawn continuously over the rollers above and below by link belts, and gives very satisfactory and economical results.

The next building west, with a liberal space be-



tween, is the smith and machine shop, 100 x 725 ft., the north end being given up to the forge and blacksmith appliances, including punches, shears, bulldozers, steam hammers and furnaces. Oil fuel will be used. The machine end has a good supply of lathes, bolt cutters and the requisite machines for properly getting out car material. A number of wheel-boring machines are near the centre and convenient to the wheel press, which stands over a track, and just in front of a large door, allowing the wheels when pressed on the axles to be dropped on these rails, and rolled over to the erecting shop to the west.

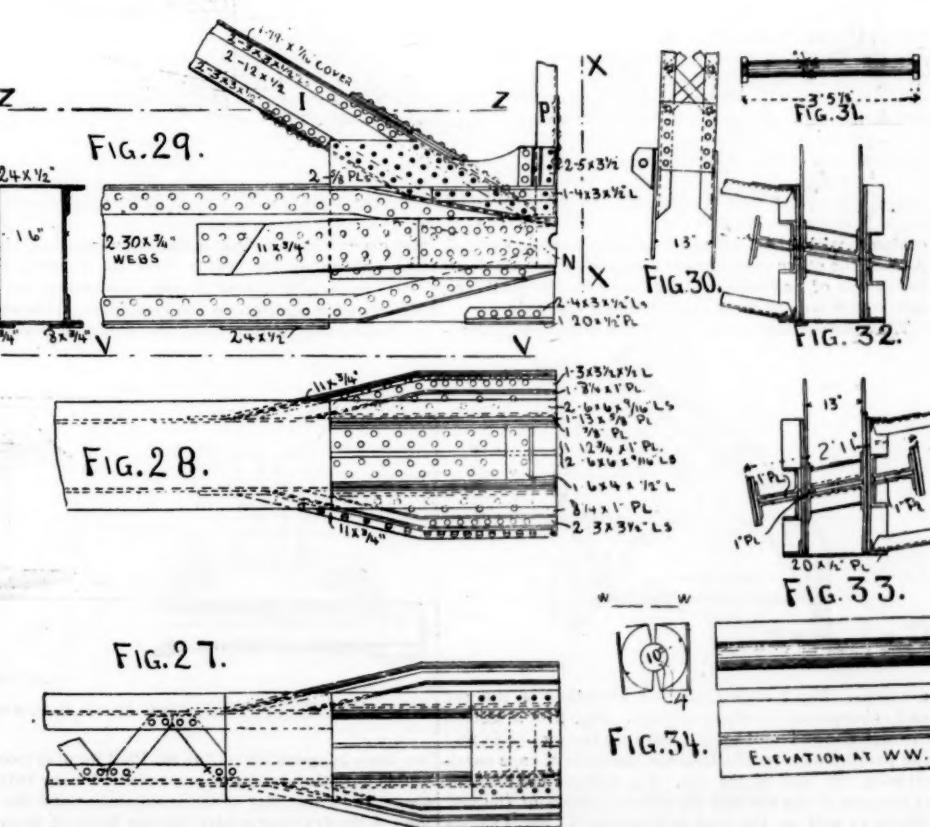
A few feet south of the machine shop is the engine and boiler house, with an iron stack 100 ft. high. The engines are of the Corliss type, built by a St. Louis firm, and are respectively 500 and 300 horse power, calculated for a steam pressure of 90 pounds at the boilers, which are eight in number, connected up in pairs, and are 60 in. in diameter. The width of this building is the same as that of the shop adjoining, and the length, 104 ft., makes it practically square.

The erecting shop is 164 x 916 ft., with eight tracks 815 ft. long each, and four overhead supply tracks over alternate tracks, to permit material to be delivered when needed. The building has a flat roof across the centre, with a short incline at either side, each of the four trusses (of about 40 ft. each) resting on pillars, of which there are three rows. The wood-working shop is situated at one end of this building, and between this and the smithshop is a large storeroom, so arranged as to permit the distribution of supplies with the least amount of labor. The roof trusses of all the buildings are of the combination type, part of the members being made up by the bolting together of 2-in. planking. The roofs themselves are of slate and are provided with heavy hammered glass skylights, so that, as the main walls are high, there is ample light and air. In the foundry there is space provided between the trusses for a pattern shop by laying a floor across the bottom chords and partitioning off several sections. The buildings are of mill construction throughout and present a very well proportioned appearance.

It is the expectation of the company to soon put on a force of from 1,500 to 2,000 men, and not only to manufacture cars of all kinds, but to undertake largely the repairing of partially worn out equipment, also to make and compete in the market for the sale of cast chilled wheels of every description. They anticipate an output of 40 to 50 freight cars and 450 to 500 chilled wheels per day, besides the miscellaneous work above referred to.

The equipment about the plant is of the best, and includes the most approved appliances for this character of work, the fact of the bulk of the machinery having been purchased from such well known concerns as The Berry & Orton Co., of Philadelphia, and the wood-working machinery from Greenlee, of Chicago, being sufficient guarantee of its excellence. The ground about here is of a clayey nature, with sand underlying, so that a good foun-

dation may be had on which to build with but slight excavation. This, combined with the fact that transportation facilities are of the best and right at their door, and that the land is very flat, thus getting rid of the expenses incident to grading, such a site as this is, directly opposite the city of St. Louis, make this plant pre-eminently fit for the most economical working of an extensive establishment of this kind.



Driving Park Avenue Bridge—Details.

Barr's Vestibule—Chicago, Milwaukee & St. Paul Railway.

As our readers are aware the Chicago, Milwaukee & St. Paul runs its own parlor and sleeping car service. The entire service is under the management of the road, the

and Fig. 5 the plan of the lamp dome with the end construction of the car roof.

The general features of this vestibule are as follows: There is a face-plate which is carried outward and inward at the bottom of the second buffer, to which it is loosely attached. As the bottom moves out, the top is

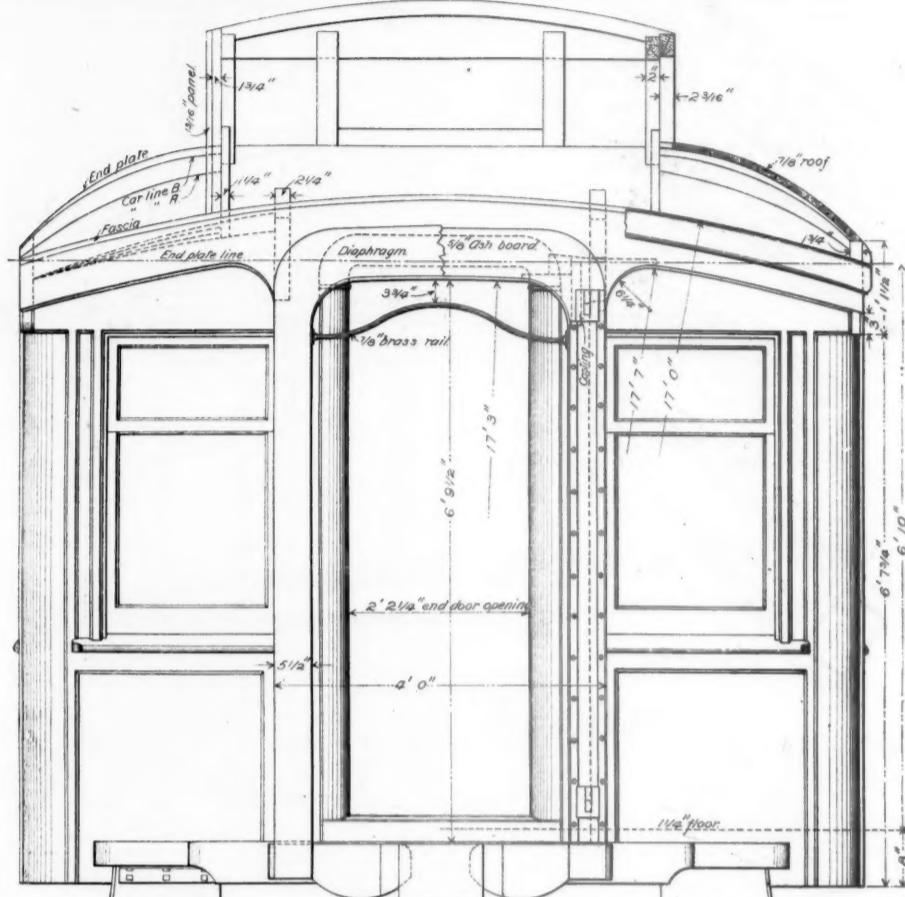


Fig. 1.

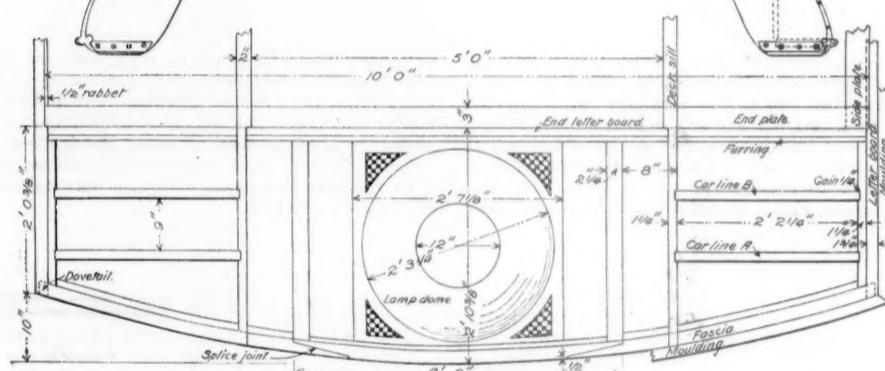


Fig. 5.

BARR'S VESTIBULE, CHICAGO, MILWAUKEE & ST. PAUL RAILWAY.

contract with the Pullman company having expired. Among the other independent features of this service is the design of vestibule which is used on nearly all cars, and which is quite unlike the Pullman vestibule.

The construction is shown by the accompanying en-

gravings. Fig. 1 shows the end elevation of the car and face-plate of the vestibule. Fig. 2 is a section through the end of the car, showing the face-plate and the parallel motion which keeps the plate always parallel with the end of the car. Fig. 3 shows the exterior of the end of the car and the canvas portion of the vestibule, as well as the door arrangements. Fig. 4 shows the lamp dome and method of ventilation of vestibule,

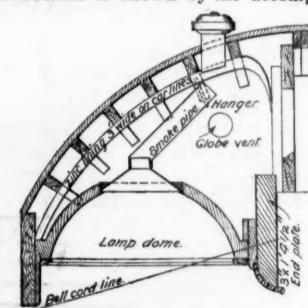


Fig. 4.

gravings. Fig. 1 shows the end elevation of the car and face-plate of the vestibule. Fig. 2 is a section through the end of the car, showing the face-plate and the parallel motion which keeps the plate always parallel with the end of the car. Fig. 3 shows the exterior of the end of the car and the canvas portion of the vestibule, as well as the door arrangements. Fig. 4 shows the lamp dome and method of ventilation of vestibule,

also carried out an equal distance by means of the links and rod connection which form the parallel motion. There is an adjustment in the connecting rod which regulates the position of the faceplate. This vestibule is considerably lighter than the Pullman design, and

Continuous Rail Joint on the Cable Road.

The Continuous Rail Joint, manufactured by The McConway & Torley Co., of Pittsburgh, is being applied to all the joints of the double track of the Broadway cable road now building in New York City. The joint as so applied is shown in the engraving. The reader is doubtless familiar with the principle. The malleable iron clip which goes immediately under the ends of the rails is driven on and then tightened by the large bolt which is shown. The bolt used in this case is 1 in. in diameter. The wedging action of the clips when drawn together gives a powerful effect in bringing the two ends to the same level. It is claimed, moreover, that by the use of this joint the same flexibility is obtained at the joint as in the rest of the rail; hence, we suppose, the name "continuous." The angle plates as shown here are no part of the continuous joint. They are of the pattern selected by the engineers of the cable road and are designed rather to hold the rails in line than to maintain the level of the joint. On the side elevation may be seen a slotted plate, which serves at once as a nut-lock and to keep the clip from shifting either way so as to insure its central position under the joint.

This joint has been in experimental use for a good while, but has been pushed forward rather cautiously by the makers with a view to determine its value before a great deal of money is invested in it. At present it is in use on some 20 different railroads, and the reports received of its performance are excellent. The only road that we have heard of as having adopted it as a standard is the Flint & Pere Marquette.

The Ravenna Disaster.

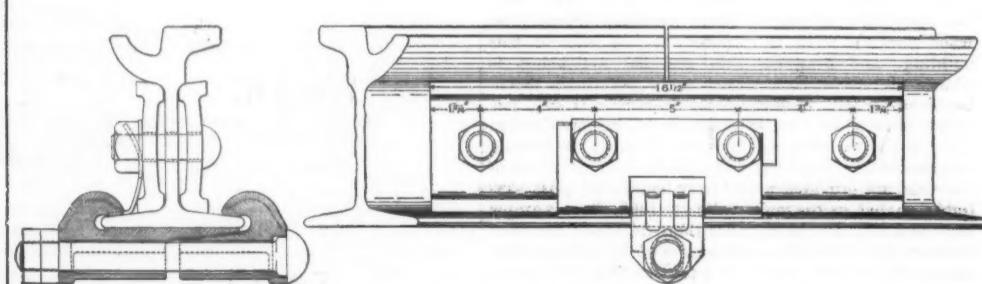
The reports of the testimony given at the coroner's inquest since that published in our last issue give a few additional facts of interest. There was a speed recorder on the freight locomotive, and it shows that the train ran 20 miles an hour for the first three miles, 28 miles an hour for the fourth mile and 30 miles an hour for the remaining distance until within half a mile of the point of collision. At one-eighth of a mile the rate was 20 miles, and this is the estimated speed at the time of collision. The train-order signal at Ravenna showed all clear, and the runner says he saw that before he saw the brakeman's red lantern. The operator testified that, although the passenger engine had passed the train-order signal, he followed his invariable rule to leave it in the clear position until the whole train should have passed 300 ft. beyond the signal. The tenor of the engineer's testimony would seem to indicate that he is not confident that he could have stopped at the train-order signal if it had been against him. He had a dispatcher's order making a meeting point for him at Freedom, a station beyond Ravenna, and appears to have assumed that this afforded him a warrant that the Ravenna signal would not be against him. He was called for the return trip in 20 minutes after he arrived at Kent. His engine was new and he asked the conductor not to let him down the hill faster than 25 miles an hour. Asked if he was not required to always approach stations under control, he said no, and named the water stations where that rule is in force.

The freight conductor registered at Kent as leaving at 2:15, actually started about 2:17; claims the express started at 2:10 1/2. The brakemen left the caboose to go upon the top of the train about a mile before reaching Ravenna, as is their custom.

Division Superintendent J. S. Matson testified that the tangent west from the station is over a mile long. The grade is descending some of the way at the rate of 50 ft. per mile.

It appeared that on the train register at Kent the time of the departure of the freight had been changed from 2:15 to 2:18, but the witness who told this did not know who did it. The switchman at the east yard in Kent estimated the interval between the trains at 4 minutes, though probably No. 82 was in motion within 2 minutes after No. 8 had passed.

Barney Dyer, the signalman at the Cleveland & Pitts-

CONTINUOUS RAIL JOINT.
Made by the McCONWAY & TORLEY CO., PITTSBURGH, PA.

burgh crossing, which is 3 1/4 miles west of Ravenna, noticed that No. 8 gave an imperfect whistle signal on approaching the crossing, and that the train was running more slowly than usual. He was just about to sit down, when he heard another whistle, and looking around he

saw No. 82 coming at a greater rate of speed than No. 8. The express train was then just rounding the curve, about a mile distant. "Says I to myself, says I, this is a h-l of a way to railroad." He thought No. 82 was not more than two minutes behind No. 8.

The state inspector, M. J. McNarna, has made a report holding that the conductor, engineer and brake men of train 82 are guilty of gross negligence for not

This resulted in a railroad war, of the mild kind custom, any in Europe, which has only this year been brought to a close by a pool between the French Paris, Lyons & Mediterranean Railroad Company and the administration of the railroads of Alsace and Lorraine, which are the property of the German Empire. This arrangement was approved by the French Minister of Public Works and German authorities intrusted with the matter.

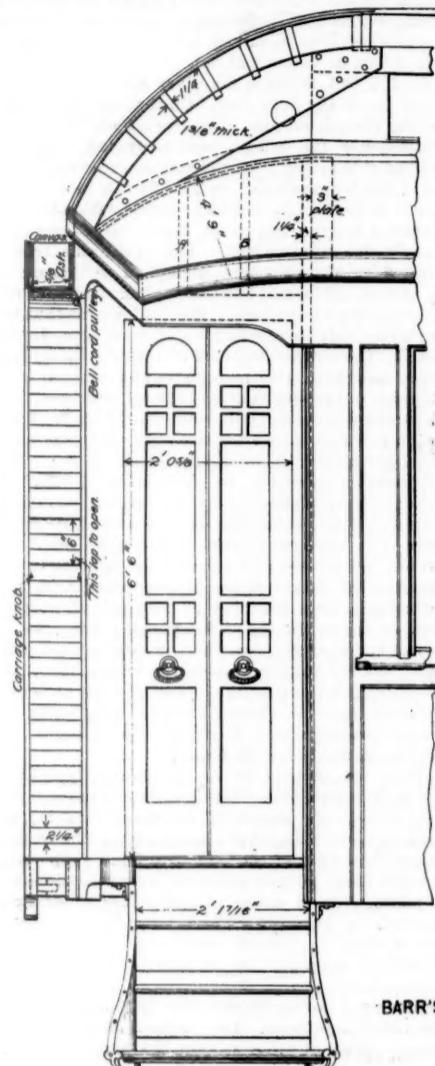


Fig. 3.

BARR'S VESTIBULE, CHICAGO, MILWAUKEE & ST. PAUL RAILWAY.

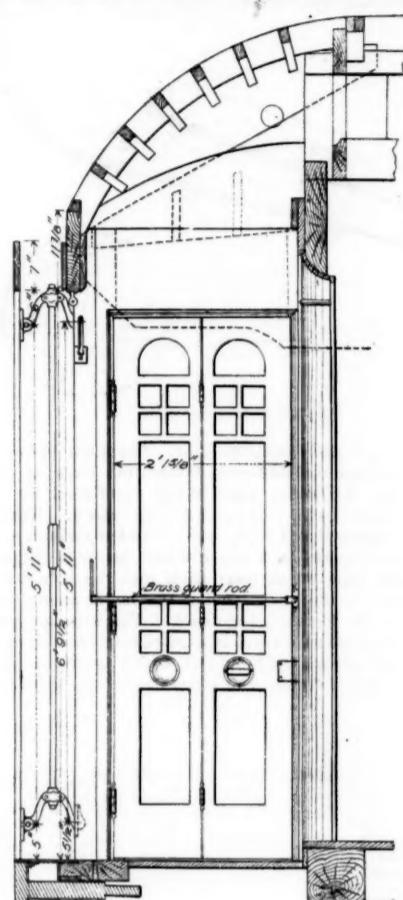
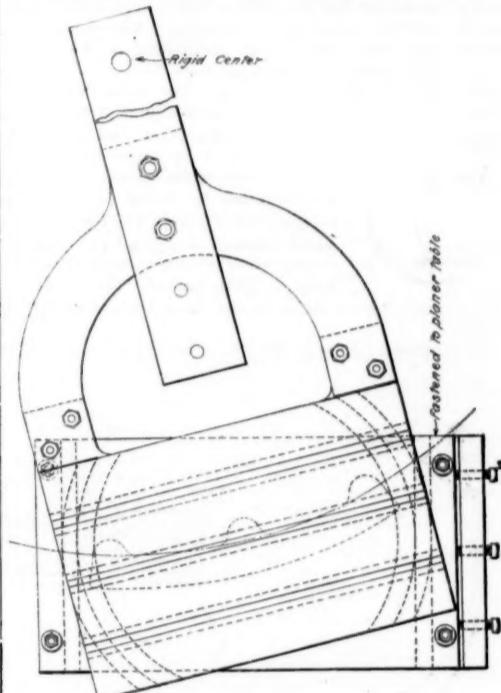


Fig. 2.

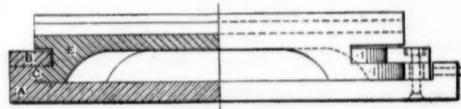
to considerable distance by pressing either one spring or the other, and when the car returns to a straight track the coupling is pushed to the centre by means of these springs. This carrier iron is sometimes made in cast steel with ribs on the bottom, as shown in fig. 2. For the back of locomotive tenders and for work on short curves such a carrier as this is eminently useful. During the last six months there has been some considerable argument offered regarding tender couplings which would lead one to surmise that eventually the same shank which is now used for freight cars would be used for tenders, in order to prevent the sagging of the bumpers and to give more freedom to the drawhead. It is for such purposes as this that the device shown is particularly adapted.

Shop Notes—Denver & Rio Grande.

The Burnham shops of the Denver & Rio Grande, a few miles south of the Union Depot at Denver, are so laid out as to give excellent opportunities for handling the repairs of the line, which still consist of both narrow and standard gauge equipment, though virtually all main-line work is now the latter. The motive power on



Link Planer



having their train under control when approaching Ravenna; also that Boynton, flagman on train No. 8, was negligent in not dropping off a lighted fusee when he saw train 82 coming [at C. & P. crossing].

Foreign Notes.

The railroads of Austria and Hungary announce that they will introduce standard time Oct. 1 next. Their standard will be the time of the meridian 15 degrees east of Greenwich, which differs by only two minutes from that of the city of Prague.

The length of the railroads belonging to the German Railroad Union was 46,083 miles Jan. 1 last, 25,000 miles being in Germany, 16,121 in Austria-Hungary, 1,680 in Holland, 1,478 in Roumania, 434 in Belgium, 307 in Russian Poland, 100 in Luxembourg and 63 miles in Russia. The length of the Union roads increased 866 miles during 1890.

What is called London proper covers an area of about 117 square miles, which is 63 miles less than the area of Chicago, and in this area resides a population of about 4,200,000. In this area there are 233 miles of railroad owned by 17 different companies, one company having as much as 44 miles, and others 27, 23, 22 and 14 1/2 miles each—none of these being a city road like the two underground lines and the North London. Laid parallel and at equal distances from each other, these lines would put every foot of ground in the city within a quarter of a mile of a railroad. But there is population about equal to that of New York surrounding this inner London which is virtually a part of the city. Counting as this outer London only that part over which the jurisdiction of the Metropolitan Police extends, which is, roughly, for a radius of 15 miles from Charing Cross, we have 570 more square miles, and on this area 316 more miles of railroad, making 549 miles in all.

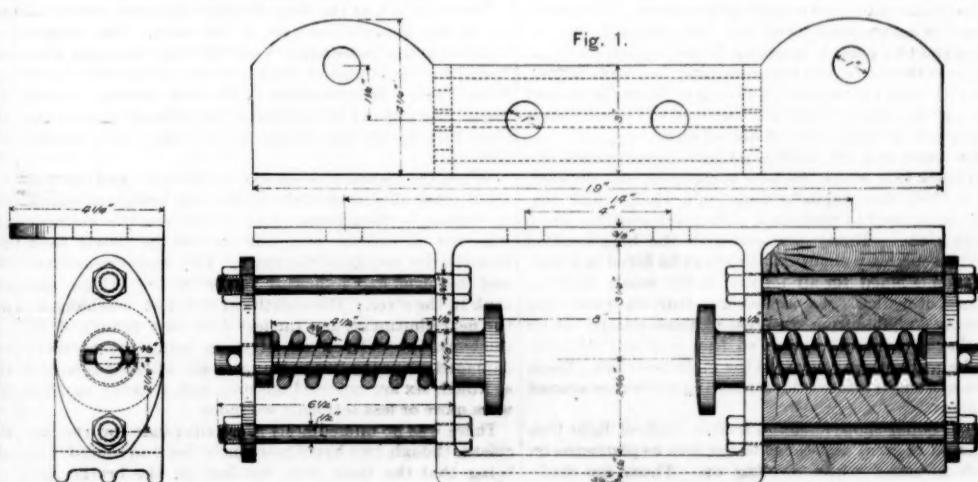
Since the opening of the St. Gotthard Railroad a great part of the railroad freight passing between England and Belgium on the north and Italy on the south, mounting to 60,000 or 70,000 tons yearly, has been diverted from the Mont Cenis line to the newer road.

A New Drawbar Carrier Iron.

There has been considerable discussion during the past year regarding the effect on couplers when placed on long and short cars which have to run coupled together over sharp curves. To meet the increased lateral motion made necessary under these conditions the accompanying design of carrier iron has been brought out by the Thurmond Car Coupler Co. It consists of a carrier iron, as shown in fig. 1, which is forged all in one piece, of dimensions suitable for receiving a vertical-plane drawbar, and allowing it a considerable lateral motion. To return the drawbar to the centre, one spring is provided on each side with a button head pin, which just clears the drawbar under normal conditions. On a sharp curve the coupling head can move laterally

the line is comparatively new throughout, on account of the track so recently having been made standard, and, although the company has a large mileage of narrow gauge, their main trunk between Denver and Salt Lake City is 4 ft. 8 1/2 in., running up from Salida and down the cañon of the Grand River to Grand Junction, where it joins the original line coming over Marshall Pass.

On the western roads having long distances through sparsely settled and at times barren sections it is not only a matter of convenience but of necessity for the



CARRIER IRON FOR FREIGHT CAR DRAWBARS.

Made by the THURMOND CAR COUPLER COMPANY.

officers to use private cars in order to get over the line for inspection without starving, and the Rio Grande has its share of these so-called luxuries. These cars are now being lettered, A, B, C, etc., and the names and numbers discarded. They are fitted up with much taste and conveniently arranged for carrying quite a number of persons. Some of the mottoes on the panels are very suggestive of the turn sometimes taken by the railroad official's mind such as the following: "Do good while you live You will be a long time dead," and in some instances they have even lapsed into Latin. In a private car now being built for the Rio Grande Western one end is entirely given up to the use of the train crew, there being sleeping accommodations for the conductor, brakeman, engineer and fireman. The kitchen occupies the whole width of the car, giving much extra room for lockers, etc. The finish is in light wood, not at all elaborate, but in very good taste.

In the engine department the machines are kept well filled with work, there having been 108 locomotives receiving general repairs last year on seven pits. The company is now receiving 31 engines from the Baldwin works, nine of which are 10-wheelers, built according to this company's most approved designs. The extension wagon top feature has been found to give most excellent results, and was in fact first advocated by this company, and has now been used on all the power of the Rio Grande built during the last four years.

Solid-end siderods are finding much favor here, as elsewhere, and on some of the engines brass eccentric straps are being tried, fastened to the shaft by a set screw and key, the two parts of the eccentric being held together as shown in the accompanying sketch. The bolts are fitted through the small piece and tapped into the larger part, and also have a jam nut on the inside, they being screwed in from the back with a socket wrench.

The shop tools embrace those in general use for ordin-

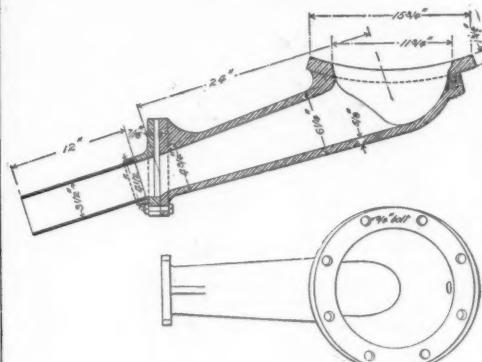
Tapped into this



weight due to the uneven distribution of metal about the centre line of the boiler.

Between the boiler and machine shops the transfer table is divided into three segments, facilitating the moving of trucks from one pit to another. This is, however, somewhat of a disadvantage when making use of all three parts together, and the points in its favor will hardly compensate for those drawbacks.

We illustrate the "Grove" cinder ejector as used on

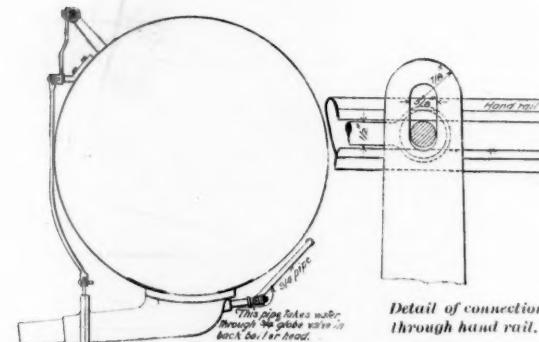


Spark Ejector-Nozzle.

many of the engines along the line. The main piece is of cast iron fastened under the boiler just back of the front door, the boiler plate being reinforced by an auxiliary sheet 21 in. x 24 in. and $\frac{1}{4}$ in. thick. Below the gate the nozzle is a $\frac{3}{4}$ -in. pipe threaded and screwed into the casting, the back end of which latter is tapped for a $\frac{1}{4}$ -in. pipe which runs back into the cab into a globe valve on the back head of the boiler about one inch below the lowest gauge cock. The arrangement for operating the gate valve is worked from the cab by a rod passing through the hand rail, which is cut out for the pin at the bell crank. This pin is a stud bolts threaded

into the rod up against a shoulder, and having a thin washer on the outside of the crank, which is slotted as shown to allow for its revolving motion. In this way the bad appearance of an extra rod the length of the boiler is got rid of, and the effect given is very neat.

The shop tools embrace those in general use for ordin-



Grove Spark Ejector—Arrangement for Working from Cab.

ary repair work. Among others is an improved Bement, wheel lathe which will turn from four to five pairs of 30 in. wheels in a 10-hour day, the quality of the work from this type of machine being very good. A small machine of home manufacture for cutting and reaming tubes and ends also does a remarkable amount of work. An attachment for planing out links has been in service, here for some time and gives quite satisfactory results. The lower casting A is bored out at each end on the line C, also the two plates B, which latter are afterward bolted down, as shown. Similarly the top section has a circular groove into which the block B fits, and also the lower part is turned to the radius of C. To the top casting is bolted a wrought-iron frame, in the tail of which is the rigid centre, which is pinned to some stationary point at or near the planer frame. This may be fixed by bolting to the planer frame a wrought-iron triangle. The bottom plate A is securely bolted to the bed, and any play between the two parts is taken up by the set screws D. It will be noticed that the tail piece may be made adjustable by boring extra holes so as to give longer or shorter radii for the links, which are fastened to the secondary bedplate E, as shown by the dotted lines.

The apparatus for fitting up train hose consists of a head block into which the hose is clamped, and the casting is then screwed in by means of a wheel crank, pin being used to produce a tight joint, and the clamp put on in the ordinary manner with the long-handled jaw. In this way about 125 hose can be fitted in a day. The shop is piped for air for use in the small riveting engines, of which there are several built on trucks, the air being supplied from six Westinghouse pumps set up together in a circular frame, so that any one or more may be worked at a time into the main reservoir. These also are brought into service for testing air-brakes around the plant.

In the boiler shops skeleton frames made of light iron are found of great assistance to the men as platforms on which to stand while riveting up. Those are made strong and durable, and yet weigh but little, so as to be easily moved about. The boilers themselves are swung on small rollers and may be revolved with slight exertion, there being no friction to overcome, but simply the

into the rod up against a shoulder, and having a thin washer on the outside of the crank, which is slotted as shown to allow for its revolving motion. In this way the bad appearance of an extra rod the length of the boiler is got rid of, and the effect given is very neat.

The Railroad Bridge Failure at Mönchenstein, Switzerland.

As already announced in cable dispatches, a fatal train accident—in fact one of the most disastrous ones on record—occurred on Sunday, June 14, at Mönchenstein, near Basle, Switzerland. Probably the most complete account of the disaster, and of the bridge, whose collapse caused it, thus far published is that in the *Schweizerische Bauzeitung* of June 20 and 27, and to it we are indebted for the following particulars:

Train No. 174, of the Jura-Simplon Railroad, was made up of two locomotives and 12 full cars. The greater number of the passengers were working men and were bound for the village of Mönchenstein, about three miles from Basle. Mönchenstein is the first station beyond Basle, and about 1,640 ft. from it the railroad crosses the river Birs by an iron bridge with a span of 41 meters (134 1/2 ft.).

When the forward locomotive of the train had reached the further abutment of the bridge, the bridge collapsed. According to the account of an eye-witness the collapse was not a sudden one, but the bridge slowly sank beneath the weight of the train. The two locomotives and the seven cars following fell with the bridge, and sank in the river. The eighth car was left overhanging the near abutment, and the last four cars remained on the bank, the forward one of them being considerably damaged. Seventy-two passengers are officially reported as killed, six are reported missing, and a large number were more or less seriously wounded.

There was no immediately apparent cause for the accident, though two hypotheses have been advanced, one being that the train was derailed on the bridge, and knocked down one of the trusses; and the other, that the bridge simply gave way under the weight of the train.

The bridge was built during the seventies at the works of G. Eiffel, at Levallois-Perret, near Paris. Dur-

ing the years 1880 and 1881, examinations and tests of all Swiss iron railroad bridges were made by order of the railroad department, and it was then found that on the Jura-Berne-Luzerne railroad system, to which the line belonged at that time, there were a number of structures which called forth their criticism. Among these was the Mönchenstein bridge. But a test of the bridge, made during the month of July, 1880, developed an unfavorable result. A train of three coupled locomotives, weighing 56 tons each, produced a uniform deflection of both trusses of 15 m. m. (about 0.6 in.) and a lateral deviation of 6 m. m. (about 0.24 in.).

On Sept. 2, 1881, floods in the river Birs did considerable damage on the Jura road. On that day also a dam across the Birs, about one kilometre (about three-fifths of a mile) below the bridge, was destroyed, causing a deepening of the river. At the bridge crossing, the increase in depth was about 1 metre (3.23 ft.), and the left abutment of the bridge, of which the foundation had not been carried down to any great depth, turned partially over and broke into two parts. One of the side trusses still rested on the abutment, though a settlement of about 40 c. m. (16 inches) had taken place, while the end of the other truss hung free. The bridge was thus left supported at only three points, and was, accordingly, distorted. The strains produced were not without consequence, and there were torn plates and angular irons in a number of the diagonals and lateral members.

The bridge was temporarily supported by timber framing and a new foundation for the abutment was built, reaching down about seven metres (about 23 ft.). The new foundation proved to be thoroughly satisfactory, and its excellence is attested by its present condition. The injured truss members, so it is stated, were not removed and replaced by others, but were simply repaired by riveting over new plates. Last year the bridge was overhauled and strengthened in several parts.

The bridge crosses the river at an angle of about 50 degrees as shown in the accompanying plan, fig. 2. The upper chords were braced horizontally against wind pressure, and the cross section of the bridge, therefore, was a rectangular frame, the lower portion of which consisted of the cross girders and the upper portion of this wind bracing which was made up of angle iron diagonals and light cross girders.

The main trusses were of the triangular type, there being 6 bays in each lower chord, as shown in the elevation, fig. 1. Each bay measured 7 metres (about 23 ft.), the inclined members being of the same length. The vertical ties simply transmitted the load to a joint, supporting, as they did, cross girders arranged between the lower chord joints, so as to make available shorter stringers for carrying the cross ties. These vertical ties consisted only of two light angle irons, which, however, may have been entirely adequate for the service for which they were designed.

The upper and lower chords were of T section, made of plates and angle irons. The inclined members were of varying forms of cross section, the section for the heaviest ones being in the shape of a cross.

In the illustrations fig. 1 represents an elevation of the bridge, and fig. 2, a plan. The angle which the bridge made with the course of the river was 50° 46' 30"; the span was 41 metres (134 1/2 ft.); and the length of the trusses was 42.8 metres (140 3/8 ft.). The left hand portion of fig. 3 represents a cross section of the bridge in its original condition; the right hand portion shows it after it had been strengthened.

The longitudinal and cross girders were plate girders, built in the ordinary way, the former consisting originally of plates measuring 600×7 mm. (23.6 x $\frac{1}{16}$ in.), and four angle irons measuring $70 \times 70 \times 7$ mm. (2.8 x 2.8 x $\frac{1}{16}$ in.); and the latter consisting of plates measuring 850×7 mm. (33.5 x $\frac{1}{16}$ in.), and four angle irons measuring $80 \times 80 \times 10$ mm. (3.15 x 3.15 x $\frac{1}{16}$ in.). These girders were fastened to each other by one angle iron in each, measuring $70 \times 70 \times 7$ mm. (2.8 x 2.8 x $\frac{1}{16}$ in.).

In the work of overhauling and strengthening the bridge last year the plates of the cross girders were stiffened by two angle irons, measuring $80 \times 80 \times 10$ mm. (3.15 x 3.15 x $\frac{1}{16}$ in.), running diagonally in the end portions (see cross section of bridge, fig. 3) and which partially transmitted the live loads directly to the lower main chords. Strengthening plates $3\frac{1}{2}$ metres (11.48 ft.) long, 170 mm. (6.7 in.) wide and 10 mm. ($\frac{1}{16}$ in.) thick were also riveted to the tops and bottoms of the girders. The fastenings between the cross and longitudinal girders were further reinforced by another angle iron, as shown; and finally it was attempted to stiffen the connections between the vertical ties and cross girders by small, triangular plates. The longitudinal girders, which directly support the cross ties, are 1.7 metre (about 5.6 ft.) apart, and the length of the cross girders is 4.7 metres (15.4 ft.). The end posts consisted of the heavy end braces already referred to.

There is no authentic record of the exact details of the train under which the bridge gave away, but it is thought that the design provided amply for the weight which was imposed upon it.

In analyzing the nature of the accident, it is concluded that the forward engine had reached the far abutment of the bridge when the collapse took place.

The left front wheel of the engine was already on firm ground while the right front wheel was still on the bridge. The engine, in falling, consequently turned over to the right and rolled down the bank of the river, coming to a stop in a position partly under water. The

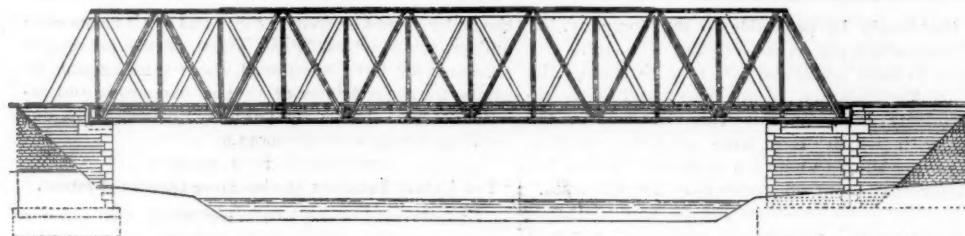
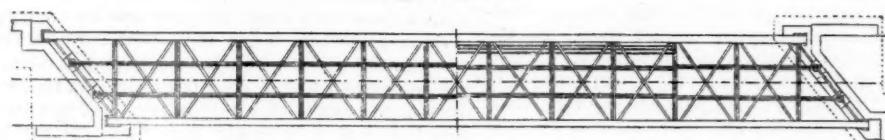
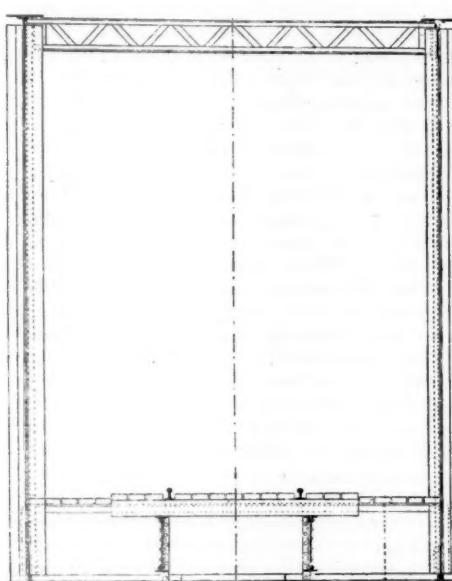


Fig. 1--Elevation.



Plan of Top Chords, etc.

Plan of Bottom Chords, etc.



Section before Strengthening.

Fig. 3. Section after Strengthening.

THE SWISS BRIDGE DISASTER.

Bridge over the River Birs at Mönchenstein, Switzerland, on the Jura-Simplon Railroad, which fell under a Passenger Train June 14, 1889.

second locomotive dropped vertically into the river, and behind it the several wrecked cars. Of the lower portion of the bridge only short end sections were visible, the remainder being under water. The upper portions, which remained above water, comprising the upper chords, tie braces, vertical ties and wind bracing, created the impression that the bridge had broken in the middle, the up-stream side giving way first. That side, at the time of the accident, was the more heavily loaded one, as the locomotives were nearer its middle. It would seem, from every account, that there was a repeated up-and-down motion of the bridge before it finally fell, and it is therefore not at all probable that the accident was brought about by the failure of the lower chord. Had that been the case the collapse, it is agreed, would have been practically instantaneous.

Prominence is given to the fact that the bridge abutments remained almost intact, the masonry having been damaged only by the tearing away of the bearing plates and in several places where exposed to the falling structure.

The Swiss railroad department appointed Professors W. Ritter and L. Tetmajer to make an examination and report. Both these gentlemen have since been entirely engaged in gathering data likely to clear up whatever mystery surrounds the accident. Up to date, however, nothing but a preliminary report has been issued by them, and in this no attempt has been made to point out the probable cause of the breakdown. Their examinations had not gone far enough to warrant any expression of opinion.

The bridge was approached on a three per cent. down grade, and was located for two-thirds of its length in a straight line, and for one-third in a pretty sharp curve.

The *Bauzeitung* says that after the flood of September, 1881, and subsequent to the repairs made at that time, the bridge was tested with two locomotives weighing 58½ tons each. Mr. Stickelberger, engineer of the Jura Simplon Railroad, stated that when, in 1889, the use of heavier locomotives was contemplated the various bridges along the line were examined and their strengths calculated. It was found, in the course of this work, that only the lower, track, portion of the Mönchenstein bridge needed re-enforcement. This was carried out in the manner already spoken of. The locomotives of the wrecked train, it is further stated, did not belong to the heaviest class of the road.

In reviewing the accident, Gustav Mantel, an engineer of Zürich, points to the probability that no single, definite cause will be found to which the breakdown could be attributed. One of the defects of the bridge, in his estimation, was the insufficiency of the cross-bracing, particularly the upper chords. With such inadequate bracing and a fair speed of train on the bridge, the vibrations of the upper chords are liable to become sufficiently great to bring about buckling, and there can be no doubt, he says, that several bridge collapses could thus be accounted for. He next criticizes the lack of stiffness in the end tie-braces, and the character of their connection in the upper chords. The maintenance of the bridge, particularly so far as painting is concerned, is further criticised, it being hinted that the bridge was painted only once, at the time of its erection. In any event the painted surfaces were much rusted, especially at the various joints wherever visible, so that it is concluded that the red-lead coating which is supposed to have been applied at these points before riveting together was either entirely omitted in the first place, or, if applied at all was of a very poor quality.

With oxidation going on in the interior, at inaccessible points, an exterior coat of paint is but an indifferent protection. Attention is also drawn by Mr. Mantel to the already mentioned circumstance that at the time of repairing the bridge, after the giving way of one of the abutments in 1881, some of the injured members were simply plated over instead of being removed and replaced by new ones. The latter course should have been followed and insisted upon.

The theory of derailment of the train, Mr. Mantel further thinks, would seem to be strengthened by the fact that the bridge gave way gradually, with a series of oscillations. These would seem to point to the successive rupture of a number of cross-girders between the lower chords.

Eight Passengers Killed in Colorado.

At about 11 o'clock on Saturday night, July 11, an excursion train which was being switched from one track to another at Aspen Junction, Col., on the Colorado Midland, was struck obliquely by a freight engine approaching on a side track, and the check valve of the locomotive was knocked off in the collision. A great volume of steam at once escaped from the boiler, and the engine was standing so that this jet of steam was blown directly into the one passenger car which composed the excursion train. Every person in it was scalded, and six of them were killed on the spot. Seven

others were badly injured, of whom two have since died.

The officers of the road give the following account: A freight train was standing on a side track alongside the main track, and the engine for it was coming out of the roundhouse. The switchman had thrown the switch for this engine, when he noticed the excursion train backing down from the tank. He immediately signaled both trains to stop, which they did. He then signaled the engine to back up, and the brakeman on the rear end of the passenger train also took the order. The result was a "cornering" of the coach and the engine at the switch. The window of the compartment coach knocked off the check valve. The empty engine immediately stopped and the opening of the boiler made by the loss of the valve, being directly opposite an open window in the compartment of the coach which contained all the passengers except three colored men, poured in its killing vapor. All the other windows and doors of the car were closed, and the pressure of the steam in the compartment was so great that when a door was finally knocked open from without the pressure of the liberated steam threw the rescuer violently on his back. It is a wonder that any of the occupants of the coach are living.

Flies on the Michigan Central.

The cut which follows is a reduced fac-simile of a card which the Michigan Central attaches to bouquets of flowers that are presented to ladies traveling on that road. The original is a third larger than the cut, and the fly is a red ibis on a "No. 6 sproat hook. The fly known as the "grizzly king," made from the feathers of Great American hawks, might appropriately have been



COMPLIMENTS OF

CHIEF ENGINEER'S OFFICE.

MICHIGAN CENTRAL

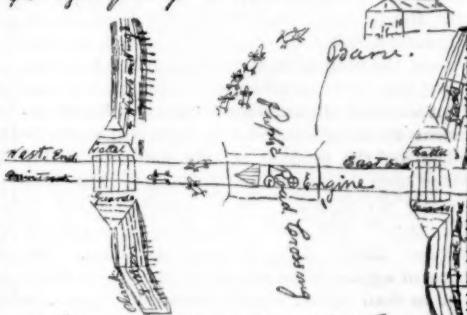
used. These bouquets are not distributed on all of the trains, but a good many thousands of them have been given to passengers. They are made of such flowers as are in season. At present roses and carnations are principally used, but many bouquets have been made of daisies and buttercups and other wild flowers. The idea is a pretty one, and will doubtless be imitated.

How Five Pigs Were Not Killed.

The section foremen of the Toledo, St. Louis & Kansas City Railroad are furnished with a blank on which to make reports of stock killed, which bears on its face the following instructions: "Section foremen must make a written report, in copying-ink, of all stock killed or injured, stating clearly all circumstances connected therewith. If in or near depot grounds or public and private crossings, roadmasters or section foremen must make a sketch on back of report, showing where animal got on the right of way or track, where body was found, and, if known, where animal was struck." A zealous foreman with a gift for free hand drawing has sent in, in obedience to the instructions, a report of which the following is a reduced facsimile:

Walter, R. M.

Dear Sirs with make a kind of Sketch of showing who animal got on R. how it got on right of way or track



An Electric Railroad.

The Marquette City & Presque Isle Railroad, which is operating the Thomson Houston system, has recently been put in operation. This line comprises three miles of track, and is at present operating three motor cars. This is the first road in Michigan equipped by the Thomson-Houston Electric Co.

Lake Freights Forty Odd Years Ago.

An old schooner the "Algonquin," which was built at Black Rock in 1839, hauled overland around the Sault Ste. Marie and eventually sunk in Superior Harbor, was lately dug up by a dredging contractor. It is of only 60 tons burden, but it did a profitable business, carrying flour from the Soo to Superior City at \$1.25 per barrel, among other things. It is proposed to repair and rig it for exhibition at the World's Fair in Chicago.

Steel Manufacture in China.

The steel works of which we have before spoken have been begun near Hanyang, on the western bank of the Han River, in China. The works are designed for the manufacture of rails, gun steel and merchant iron. Bessemer and Siemens-Martin furnaces are being built and machinery has been ordered from England. Some of it has already arrived at Shanghai.

Photography in Railroading.

The principal bridges and stations of the Pittsburgh Division of the Baltimore & Ohio will be photographed, and the photographs bound in a volume to be used for reference in the Division Engineer's office. Most of the stations and bridges on the Philadelphia Division have already been filed in this way.



Published Every Friday.
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns our own opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The Advisory Board of the Western Traffic Association met in New York on Tuesday and Wednesday of this week, but did nothing worth while. The official report will show that the question of joint agencies was discussed, but postponed to October; that mileage rates on private owners' refrigerator cars were taken up, but referred to the Commissioners, and that the complaints about the Indiana, Illinois & Iowa getting too much freight were treated the same way; it was voted that the Missouri Pacific should obey the Commissioners' orders to divert salt traffic at Hutchinson, Kansas, and, moreover, submit to a division of all traffic at that point; and the Atchison, Topeka & Santa Fé was reminded that it must not try to elude the rules of the Association by omitting to report shipments of grain from Nebraska and Kansas to Galveston. But these are small details for Presidents to go a thousand miles to settle. The only important matter was the joint-agency question, and it had been given out that the Commissioners had a plan to submit; but with the Alton and the Stickney roads still independent, the completest plan in the world would be worthless, and the beauties of this one will probably be hidden from the world a while longer. But there was really no occasion for a meeting except to "mark time," and this one has accomplished its purpose. Rate cutting is at a minimum. The prospects of a good fall traffic have already been discounted in Wall street, and the presidents cannot, by holding a meeting, either advance or depress their securities; so there is nothing to do but keep quiet. Jay Gould did not deem it necessary to be interviewed more than a quarter of a column.

After a trial of several months the Southern Pacific has decided to do away with train collectors, the system being expensive, with no commensurate advantage. Conductors will receive better pay, and the selection of men to fill this responsible position will be made with greater care than formerly, with a view to cultivating a spirit of honesty as well as of efficiency.

The above is taken from a Western paper, and may or may not be strictly accurate in every particular, but if it is not it ought to be. It is true that it is often easier to select honest money handlers from among office clerks than from among freight conductors, for the simple reason that these two classes were originally recruited with very different ends in view, and it therefore may in many cases seem good economy to put on train collectors; but it is hard to see any valid argument for making the system permanent, or any evidence that if tried temporarily its benefits will continue to any extent afterward. Care in selection is indeed, as here stated, the main remedy for dishonesty in collecting fares; and it needs but little calculation to see that even if the exercise of this care has to be begun five years, or even 10, before the man is wanted, it still will prove more profitable and businesslike than to hire two men for work that can be done by one. It is also true that on many trains there may be found employment for an additional

man that would be profitable to the company, but those roads which put on collectors never seem to give attention to these additional duties or to change the work of the trainmen in any way; and some superintendents must by this time be sick of the fiction with which they have stuffed reporters, about paying an extra man \$75 a month "so that the conductor may more efficiently care for his train." We are told that the Southern Pacific will "cultivate a spirit of honesty." We do not know who invented this phrase; and some people will doubtless laugh at it, agreeing with the general view that voluntary honesty is always either native or—not there. But the company can do something in cultivating the *habit* of honesty if nothing more, and habit will strengthen the spirit. To train a passenger conductor for collecting \$50 a day by keeping him for 10 years on a freight train where he handles no money at all is to deliberately neglect the cultivation of his "spirit of honesty."

Injector Check Attachments to Locomotive Boilers.

We give in another column an account of another most distressing train accident, making the third this month, this time on the Colorado Midland; eight or ten people were scalded to death and others were made to suffer most horribly. The prime cause was a side collision between a locomotive and a passenger train. This is just such a collision as we hear of every now and then, especially in large yards, where thousands of movements are made daily, and where the infrequency of them is, after all, surprising; and it is of a kind that usually does comparatively little harm. The hand signaling here may have been worse than ordinary, or it may not—we have not the particulars; but however that may be, we know that with the best signaling, men will sometimes overrun the fouling-point, and we may therefore in this case look particularly at the immediate cause of the horrible torture inflicted on the passengers—the absence of a proper injector check valve or protection for the valve. This valve was broken off, and a 2-in. or 2½-in. jet of water at about 360 degrees Fahr. was poured in through the windows of the passenger car, dealing death and misery.

The common method of attaching injector checks to locomotive boilers is faulty and weak. Locomotive builders know how different are the demands of purchasers in this respect. Some require large flanges cast on the checks, which are then fastened to the boiler by three or four 4-in. studs. This plan is secure and safe in any ordinary collision, unless the checks project out from the boiler an unreasonable distance. The old and faulty plan of attachment is to screw the shank of the valve directly into the shell of the boiler. With this there is generally so little material left after the threads are cut on the shank that a light blow will break off the check, and sometimes the expansion of the check pipe will alone be sufficient to cause the check to crack off. Various rear collisions of freight trains and some of passenger trains have long since shown this construction to be bad, and for the last five years builders have been required by careful purchasers to put on the flanges just described; and to-day no master mechanic or locomotive builder who seeks to build a safe engine would think of using the old attachment, any more than he would now use the old combination stand in the cab or attach the steam piping to the structure of the cab, both of which practices have been discarded because of the inevitable breakage in minor collisions which lets out hot water and steam into the cab and scalds the men. There is no other detail attached to a locomotive boiler at the front end that is so liable to be broken off and that will allow so much hot water and steam to escape in a wreck as the injector check. All other parts are attached by solid studs which do not have holes through them.

It is impossible to attach an injector check to a locomotive boiler in any way that will withstand the force of the violent collisions which sometimes take place, but there is no excuse for their breaking off in minor accidents, for the practice of the most careful builders can be imitated by all. The additional expense is too trifling to mention. In addition to the adoption of a better manner of attachment, some roads have gone farther and changed the form of the check itself to one particularly adapted to ward off blows, and in which the projection from the boiler is much reduced. Others have provided a ball check valve in the interior of the boiler, which will close at once if the check is broken, just as the safety check closes on the best forms of water glasses in the cab when the glass breaks. Fatal accidents from ruptured pipes of the nature we are now considering are somewhat common, and the need of a better attachment than a screwed shank check projecting a considerable distance from

the boiler should be well known; and as all locomotive builders know, or easily can know, of the preventive measures we have mentioned, there is no reasonable excuse for the continuance of the dangerous and inferior screwed shanks such as are still being sent out regularly by some of our shops.

The Latest Sacrifice to the Time-Interval System.

The full report of the testimony before the coroner clearly explains the most important causes of the Ravenna disaster and leaves little doubt as to the relative responsibility of the different men involved, and of the management. From the account printed elsewhere in this paper, with what we gave last week, it will be seen that (1) the prescribed interval of time was five minutes, and (2) that this interval was not maintained as well as it might have been; (3) that the freight had no power brake; (4) that it was allowed regularly to run 25 miles an hour, and (5) that it was allowed in this case to run practically as fast as the passenger, thus bringing it to Ravenna about five minutes behind No. 8, while the brakeman of the latter was not required to go back until three of the five minutes had elapsed. Thus we have a safety interval of only two minutes, which is too short, and will largely justify the press all over the country in the demand it is making that railroads adopt higher standards of safety. Most of the newspaper writers do not know exactly what they want, and are very vague in their recommendations (especially such of them as have any practicability), but it is a good time for railroad officers to enlighten the editors a little as to the dilemma the roads are in, and the difficulty of getting out of it; and no harm would be done if it were more generally the custom for railroad men to defend themselves in print. A few papers like the *Philadelphia Press* have sensible ideas, which they express in a tone that on the whole is very reasonable, and it is much to be regretted that the public's share of the responsibility for unsafe methods in railroading is not set forth while the subject is a live one.

The lesson to be emphasized is the great superiority of a space interval—the block system—over any time-interval system. This lesson is old, but it will bear reiteration. It is true that the present Erie rules can be modified so as to make the practice safer, and if we wished to promote the use of the time-interval system a most effective opening argument could be based on the considerations that were set forth in these columns after the Palatine Bridge collision (*Railroad Gazette*, Nov. 1, 1889, page 715, touching the inadequacy of any interval less than ten minutes); but the more the time-interval system is discussed the more numerous do its weaknesses appear. There will always be conditions which it cannot possibly meet, and it always must depend, in the last resort, on the use of good judgment by the trainmen. Any system does, indeed, need something besides machine men, but the block system can get along with them *far better than the other can*, and argument is not needed to show that a system which is so simple as to work in spite of the deficiencies of ignorant men is always, other things being equal, the best to be used by any men; for no man is perfect.

The weaknesses of the present system are forcibly shown by taking up the various lines of defense that the different men in the Ravenna case will set up for themselves. First, the brakeman. Without pressing his claim that the stop was only three minutes, he can claim (1) that two minutes did not permit him to go more than about six hundred feet; (2) that, the view being clear for a mile, the engineman of the freight should have had no difficulty at all in seeing the tail lights on the car, and (3) that, *knowing* the passenger to be immediately ahead of him, this runner should have moderated his speed at a station. The brakeman's reluctance to use a fusee for fear of detaining the freight, and his mental excuse (not expressed, so far as we know) that by going back from Ravenna he would unnecessarily detain his own train (or leave it short-handed), are not warranted by the rules, to be sure; but every superintendent knows that they are based on an argument that *cannot be ignored in practice*.

The freight engineer has less ground to stand upon, and he seems to have been keeping a very poor lookout; but he can say that the flagging rules require a passenger train to fully protect itself, and that high speed was ordered with a full knowledge of all the facts. He will also doubtless claim that on a descending grade the conductor should have been more careful to regulate the speed. So far as yet appears this man is in the worst position of any of those implicated. The evidence that there was a good view for a mile has not been rebutted, and he offers no good excuse for not seeing the tail light of the train. He may or may

not have been excessively tired from his 90 miles' run (followed by only an hour's rest). This brings up the general subject of overwork. The man can doubtless successfully throw the burden of responsibility for it upon the company, though, as every one knows, men are more likely to welcome extra work (and extra pay) than to object to it on considerations of safety.

In the absence of explicit evidence about the conductor and brakemen of the freight, the most that can be said is that if there had been a regular block station at Ravenna they would have been more certainly on the alert to stop there. The same is of course true as regards the engineman. The conductor can say that the hand brakes on the borrowed refrigerator cars were insufficient for the heavy loads, and that they "did not hold" as they ought to. This is a lame excuse, for every freight conductor has had experience with just such brakes all his life, but it will not be without its effect on a jury.

The signalman at the Cleveland & Pittsburgh crossing ought to have held the trains five minutes apart. We assume that he was not required by rule to do so, but his forcible remark about the conduct of business on his road applies quite aptly to himself if he did not realize, without being told, that he was the one to warn that freight. Still, the loose nature of the whole time-interval system is only again illustrated by the ease with which he can argue that the freight engineman could plainly see the tail lights of the passenger, and that therefore it would be superfluous to stop him. Look next at the Kent station man. A heavy freight can either save or waste two or three minutes in moving from a side track to the main line, and if the outlet is a good distance beyond the station, as we believe was the case at Kent, the exact time of leaving the station (where the passenger train was timed) must be estimated in any event; and if the trainmen must set up the switch after them, another uncertainty comes in. Now, what does a five-minute interval amount to in such a case, and who can administer such a system with any precision?

A special order, signed with the division superintendent's name, increased the speed of this train from 25 miles an hour to 30. The peculiar circumstances of the case will doubtless make this man's responsibility specially prominent, and deservedly so, for a very cautious man would probably have added a special warning to the men to be particularly vigilant; and yet he can say that he was only following the general policy of the road. Finally, the company itself can quickly answer all these men. The brakeman could have gone back *faster* than the rule requires; no doubt many collisions have been averted by men doing everything in their power, regardless of technicalities. No man is warranted in falling back on the letter of his instructions, to the peril of passengers, when plain common-sense tells him to do a certain act. The engineman should have refused to double the road if he felt tired, and he should have called for brakes if the conductor let him down the grade too fast. The five-minute interval out of Kent could easily have been maintained if the men had *desired* to maintain it. And so on *ad infinitum*. The company's final and real argument, whether avowed or kept in the background, that to get business it must accept the rates of its competitors, that with these rates it can barely keep out of insolvency, and that in such a condition it can make improvements but slowly, is the one that should engage the attention of legislators when they take up the question. As for the officers of the company, the half-million dollars, more or less, lost at Ravenna may be depended upon as a sufficient argument with them; though it must be acknowledged that with less enlightened managers we should be compelled, in the light of experience, to admit that a money consideration does not always insure a sufficient degree of safety to life and limb. It would be easy to follow England and pass a law compelling the use of the block system, but every one can see, from what we said last week about the operation of that law on the Cambrian lines, that it would quite likely retard progress here. Moreover, the question as to whether the promotion of safety is always a "police regulation" and under the control of the individual states, or something else, and under the control of the National Congress, is yet to be settled. So that we have a three-cornered and complicated problem: A sleepy or careless man is in a responsible position because competition is sharp, and this competition is because railroads are too numerous; the power that permitted the establishment of too many railroads has not found out how to regulate them in their rivalry, and it will perhaps not find out until the Constitution of the United States is changed so as to give Congress either more or less control over interstate commerce. Meanwhile the railroad that improves its safety appliances must do

it by the expenditure of hard cash, which it will probably get back—some time.

The one argument of those who oppose the block system doubtless is, in this case, that the freight runner would have been heedless of the block signal the same as he was of the tail light of the train. But aside from the great advantage, in itself, of a fixed signal, always to be looked for at the same place, it is always possible with such a system to test the engine-men at any time, to see how well they keep the rust off their habits. A signal can be set at danger and a train stopped at any time when its runner is suspected of carelessness. When we teach a horse to obey the word *whoa* we test him till we *know* he has learned the lesson, and punish him for every infraction of the rule. Engineers have much greater ingenuity than horses in inventing schemes of disobedience, and they do invent and practice them; and yet we let them go on in their course as long as we find it possible, by shutting our eyes, to keep ignorant of their conduct.

Standards in Freight-Car Construction.

There are those who believe that it would be easily possible to design a standard freight car which would be acceptable to a majority of the railroads of this country, but those who do thus believe cannot have looked below the surface of the problem, for if they had done so they would have found insuperable difficulties. Standards for complete structures of this sort are practically impossible until there is somewhere near a uniform principle followed by the majority of designers of cars, and then it is not possible until there is an approximation to uniformity in general dimensions. There is, however, always the possibility of adopting standard details, and there are several of these which might now be made uniform; but the entire car cannot be made so until there is a more general agreement as to the best principles of construction to follow and regarding the best forms for the minor parts.

Two disturbing elements enter into the problem now which were not present when this subject was so thoroughly ventilated a few years ago. One is the tendency to lower the sills of the car to the draft line, and the other the probable change to metal centre sills in the immediate future. The success of the continuous drawgear, when kept in good order, has taught the value of a metallic connection from end to end of the train, and the piles of broken draft timbers of wood that was not fully seasoned before it was taken out has shown the inadequacy of wood of the best quality when subjected to the buffing shocks now common in freight service. If, now, we assume that steel will stand where wood will not and that a continuous metallic connection throughout the train will reduce the breakages of trains into two parts, there is but one conclusion, and that is that metal sills are desirable if they can be obtained at a reasonable expense.

As to the assumption that steel will stand the shocks and pulls of service better than wood there can be no doubt. No intelligent engineer would dispute this point; and as for the cost of steel sills, that is settled by the offerings of such materials in large orders at less than two cents a pound, or but little more than the cost of rails. For an additional cost of ten to fifteen dollars a car we can have a draft attachment and a structure to resist blows that will have more than double the life of the present wooden framing. So, then, the adoption of a standard car will necessarily be postponed until the best sizes of metal sills shall have been determined.

The feasibility and economy of lower cars is daily made more apparent, and two roads have decided to build no more cars with the draft line below the sills. Several progressive companies are building more of the lower cars each year, and incline toward that construction for all new freight equipment. It was at first thought that the lower cars would be below the platforms of the freight stations, but experience shows that the higher cars are nearly always above the present platforms, and that in cases where the low cars are below the platforms it is as easy to wheel the freight up in unloading the low cars as to wheel it up in loading the high ones. It is also found that as the platform tracks are repaired they are always raised but never lowered, so that in many cases the low cars are on a level with the platforms as they are now.

It was also feared that putting the drawbar through the end sill in the manner which the low construction compels would result in a serious weak spot, but this has not been found to be the case, and those cars having the drawbars passing through the end sills are more easily kept in good condition, as regards the drawgear, than those in which the drawbar is below the end sills. Hence the standard car must wait for the settlement of the question of height as well as that of material. To change either the height or material

will radically change many important details. For instance, the body bolsters of low cars will be as deep as the distance from the centre plate to the under side of the flooring, while in high cars they are generally made much less than this.

It was suggested recently that a standard centre-plate be adopted, it being thought that this would be an easy detail to agree upon; but such is not the case, as the centre-plate is a joining-piece between the truck and car body, and until those parts are settled definitely there evidently can be no standard joint. Further than this, there is a wide difference of opinion as to the best shape of plate; some advocate a small bearing, about 6 in. in diameter, while others seem to have a better argument for a large bearing about 12 to 14 in. in diameter. And so we might mention other details which cannot be made standard until the main features of cars are agreed upon, within small variations of dimensions, by a majority.

Again, it is questionable if a standard car is desirable until the best or nearly the best general form has been more definitely determined by experience. If a standard truck had been adopted ten years since we should not now have the improvements that have been brought out by the exercise of individual investigation and experiment. Standards should only be adopted after experience has pointed to the best principles to follow and the best general shapes to adopt. If that is ever accomplished it will be reasonably easy to agree upon uniform dimension. We know it is a popular ground to take that a standard freight car may and should be selected at once, and some writers and speakers at railroad clubs harp on the subject a good deal; more, in fact, than it will bear; but their fallacy is a very palpable one, and these enthusiasts might better devote their attention to other matters.

The Texas Situation.

According to the Texas newspapers, the whole theory of railroad tariffs and practice is to be gone over again, this time in the "Lone Star" State. After long wrangling that state has now a railroad commission with large powers, and at its head is Senator Reagan, who resigned his seat in the United States Senate to take that of chief commissioner. This commission and the leading railroad officers of Texas have been holding a conference as a preliminary to an overhauling by the commission of the transportation agencies of the state. Mr. Reagan is well known as an advocate of extreme and rigorous rules for carriers, he being the author and most earnest supporter of the long and short haul clause of the Interstate Commerce Act, which, however, he wished made absolute without exception.

Very likely, now that he will be brought face to face with actual cases, Mr. Reagan will modify his views somewhat; but as the people of Texas have always been rather extremists in railroad matters, there is every prospect of trouble in store for the Texas roads before things settle down to some agreed basis. In this convention the chief commissioner asked the railroad men why cotton was in so high a class; why a single standard of rates could not be found; why the Texas towns were in groups as to rates; what "a common rate" was intended to mean, and why railroads should not confine themselves to transportation and not attempt to regulate profits and prices for producers.

Texas has always been a peculiar state as regards its railroad systems, and until within a few years had on this account its own classification and rules. It produces for export beyond its own borders very few articles, cotton being the largest. It imports from other states a large part of the things it consumes. Hence originally all rates were based on traffic to and from the Atlantic seaboard cities, through which most of the sales and purchases were then made. Thus a town in central Texas could buy (or sell) in New York and have its goods come either via St. Louis or via the Gulf at New Orleans or Galveston. The disadvantages of the ocean route (insurance, for instance) were equalized and all competing routes put on the same footing, or, the same Texan town could buy in St. Louis or in some Gulf port at the same cost laid down at home. Thus the rates to the towns near the Gulf were limited by the ocean carriage and the towns near the northern border could not be charged much more because of proximity to Mississippi River markets. So the only solution of the problem was to fix on some basis that would be fair to all railroads and charge that fixed tariff to all Texas cities and villages alike. This was done, and hence arose the system of "common points" which Judge Reagan is so forcibly inquiring about. Another complication arises from the products now sold in Texas and manufactured inland. New York City is no longer the largest seller in Texas of many important commodities. Soap, for example, is made in Chicago and starch near the Ohio River. So a Galveston jobber delivered a long speech before the convention, in which he complained because river and short-haul rates gave New Orleans a less through rate to Texas points than the "common-point" theory was based upon.

It will be very curious to see how the Texas Commission is going to take up these questions without going into

the matter of commercial profit, which Judge Reagan says is no business of a railroad. Very likely the experience of the Commission will be that of all of us—that tariff making is an extremely complicated business, and the longer our experience the less we are disposed to "jump in" and turn things upside down.

English Freight Rates and the Board of Trade's Provisional Orders.

The English "traders" do not seem at all satisfied with the result of their long-continued agitation for lower freight rates, and the *Iron and Steel Trades Journal*, referring to a table showing the freight rates between Birmingham and various places, on tubes, galvanized iron, girder bars, plates, rough and unfinished castings, wire not packed, nail rods, axle forgings in the rough, and other iron goods coming under table A in the iron list of the Railway Clearing-House Schedule, paid at present, those allowed by the provisional order of the Board of Trade, and those claimed in the railway companies' amendment, says: "The manufacturers complain loudly of the old rates, but they are marvels of cheapness when compared with the schedule proposed by the Board of Trade, and these again are much lower than the scale the railway officials have put forward." The rates given are as shown below in cents and decimals per ton mile, the pound sterling having been converted at the rate of \$4.88:

Distance from Birmingham. (Miles.)	Maximum rates now charged per ton mile. (Cents.)	Rates allowed by the Board of Trade. (Cents.)	Rates claimed by the railroad companies. (Cents.)
London.....112	1.931	5.211	3.810
Liverpool.....98	1.992	3.626	3.918
Manchester.....85	2.871	3.732	4.042
Warrington.....78	2.503	3.803	4.143
Leeds.....121	2.359	3.091	3.746
Huddersfield.....105	2.709	3.425	3.870
Peterborough.....97	2.932	3.624	3.939
Sandbach.....58	3.152	4.095	4.903
Stroud.....94	2.162	3.635	4.413
Carmarthen.....173	1.410	2.585	3.161
Sheffield.....75	3.253	3.819	4.661
Bristol.....92	2.122	5.665	4.439
Lincoln.....83	3.528	3.744	4.554

It will be noticed that the average haul is 97 miles and the average charge is 2.534 cents at present, and the provisional orders allow this charge to be advanced by 40 per cent. to 3.544 cents on an average, while the companies claim an advance to 4.123 cents as an average. These last-mentioned prices would make railroading very pleasant if the roads could get freight to carry at such rates.

Further reports of track laid since Jan 1 have reached us in the last three weeks, so that several corrections are to be made in the table of new mileage in the first half of 1890, which was published June 20. Our record had to be compiled in many instances from reports made out in the middle or latter part of June, and since then engineers have forwarded revised returns deducting mileage where unforeseen delays have occurred, and in other cases have added to their reports. As a result, changes are to be made in the mileage of many of the states. Nearly all the figures given in our table three weeks ago were from official sources, and great care was used in preparing the statistics for publication; but when the table was printed it was found that an error of 47 miles had occurred, through the transposition of the reports of the Carolina Midland, Nashville & Knoxville and Los Angeles Terminal from the column "under contract" to the column "track laid." Other changes reported include the reduction of the mileage of the Roanoke & Southern to 17 miles, West Virginia & Pittsburgh to 26 miles and Winona & Southwestern to 21 miles. Other small deductions have to be made, as four miles on the Nashville, Chattanooga & St. Louis, where the work was delayed and the track not laid, and 3½ miles on the Altoona & Wopsononock, etc. These deductions had been made in the figures published July 3. But a large addition is made to our totals of new track from delayed reports; as, 33 miles on the Burlington & Missouri River, 20 on the Milwaukee, Lake Shore & Western, 11 on the Rio Grande Western, 23 on the Camden & Alexandria, and 13 on the Missouri Pacific. These are the principal additions: all appear or have appeared in the news columns.

Following is the corrected table of the summary by states:

Alabama.....	133	Rhode Island.....	4
Arkansas.....	37	South Carolina.....	108
Colorado.....	80	South Dakota.....	45
Florida.....	4	Tennessee.....	40
Georgia.....	8	Texas.....	23
Illinois.....	112	Utah.....	26
Indiana.....	16	Virginia.....	94
Iowa.....	17	Washington.....	111
Kentucky.....	5	West Virginia.....	88
Louisiana.....	22	Wisconsin.....	39
Maine.....	36	Wyoming.....	21
Massachusetts.....	4	Total United States.....	1,704
Michigan.....	28		
Minnesota.....	41	Alberta.....	47
Missouri.....	6	British Columbia.....	60
Montana.....	79	Manitoba.....	27
Nebraska.....	25	New Brunswick.....	6
New Hampshire.....	7	Nova Scotia.....	5
New Jersey.....	33	Ontario.....	14
New Mexico.....	12	Quebec.....	21
New York.....	7	Mexico.....	317
North Carolina.....	84	Total Foreign.....	457
Ohio.....	83		
Oregon.....	31	Grand Total.....	2,201

The *Railway Age* in its last issue published a list of discrepancies between our figures and those published in its own columns. It takes exception to our reports that 50 miles have been laid this year on the Mobile & Girard,

69 miles on the Pacific extension of the Great Northern and 25 miles on the Burlington & Missouri River. The latter track is on the line to Deadwood, which does not appear in the *Age's* record. Our reports are from official sources, and we have no reason to doubt their correctness. Many of the discrepancies are accounted for by the later reports of the *Age*, for its figures appear two weeks after our own. There are small differences throughout the two records which taken in the aggregate amount to a considerable sum. Even the reports of two or three large roads which always appear to be made up with scrupulous care do not agree in the two records. In figuring the new track laid we only desire to find the correct totals and we are always glad to substitute other figures for our own if they are shown to be more accurate. But, as we have intimated in previous comments on this matter, it would be useless to take the necessary space or the time of our readers to enter into an elaborate discussion of records which after all are not to be accepted as final.

The disagreement between Governor Russell, of Massachusetts, and the Council (his advisory board) over the Railroad Commissionership has occasioned no end of discussion, on account of the political questions concerned in it, but it is worthy of note that an important question of public policy as regards railroads is, after all involved in the matter, if indeed it was not the controlling factor in Governor Russell's action. In an interview he says:

"There was no political pressure for Mr. Smith's nomination or for any change in that office, nor was there any candidate, to my knowledge, suggested by my party for that place. Many criticisms have been made upon the present railroad commission. There is a very general feeling that the commission has lost its influence on the subjects with which it has to deal. The tendency of commissions in Massachusetts is to be arbitrary. The railroad commission has taken a position directly in opposition, in the matter of the Cambridge bridge, to two legislatures of the people, and it required a peremptory and unanimous order of the Supreme Court to get it to do its plain and evident duty. The feeling in Cambridge was one of almost unanimous indignation that any commission should be so arbitrary in its conduct that it required the action of the court to compel it to do its duty. The result of its action has been that the bridge has been closed to the public for many months.

The Governor lives in Cambridge. The bridge referred to was authorized in 1882 to make a new thoroughfare between Cambridge and Boston, and its Cambridge approach crosses the Grand Junction branch of the Boston & Albany Railroad. The controversy was as to whether there should be a bridge or a grade crossing at this point. The law of 1882 was subsequently modified once or twice, and Cambridge finally got a grade crossing simply because a bridge would be very costly. Commissioner Crocker stood up resolutely for a bridge over the railroad, and the decision of the board ordering it was applauded as just and wise everywhere except in the city of Cambridge, and even in that city there was a division of sentiment. But the matter having been brought before the Supreme Court, the interpretation of the law contended for by Cambridge was sustained, notwithstanding the fact that the sentiment of the state was against grade crossings, that the city authorities of Boston protested against a grade crossing on this avenue and that public opinion in Boston was strongly opposed to it. The future welfare of Cambridge itself demanded a bridge, but the simple fact is that a grade crossing has been established because the parsimony of the city outweighed public safety. The legislature seems to have overridden the settled policy of the state, which, however, is not an unheard of thing. Mr. Crocker was not by any means "out of politics" before his appointment upon the commission, but the only other definite criticism of him that the Boston papers report is that some railroad officers think the board takes too much interest in the details of railroad management. These railroad men remind us of the topic we heard of down in Maine when prohibitory legislation was under discussion. He was "in favor of the law, but again its enforcement."

The Long Island Railroad has begun proceedings to condemn some land at Oyster Bay, L. I., and Mr. Corbin says that the scheme for a through all-rail line from Brooklyn to Boston over the New York & New England is to be carried out. A large ferryboat will transfer cars from Oyster Bay across to Wilson's Point, Conn., the southwestern terminus of the Housatonic road, in half an hour. The distance, however, from Brooklyn to Boston is admitted to be 251 miles, which is longer by 17 miles than the longest of the existing rail lines from New York City, and it is hard to see how the new line can take even the Brooklyn travel, which is not very great. According to a veracious interview in the New York *Evening Post*, however, the New York & New England road from Hawleyville, Conn., to Boston is a "straight line," so that perhaps Mr. Corbin's promise of a six-hour run may be fulfilled. The prospect for freight traffic is hardly more encouraging than for passengers, and can scarcely be held to justify much expenditure for ferry-boats and wharves at Oyster Bay, except by one with the magic vision that can at a glance straighten out all the curves between Hawleyville and Boston. In the first place, the all-rail freight from New England to New York is not heavy in any event, and in the second place the Long Island road has nothing particularly good to offer it in the way of terminal facilities at New York. The summer-excursion traffic from New England to the Coney Island region is the most tangible business in sight for this line, but the bulk of New Englanders who

make special trips to Coney Island go in steamboat loads direct from Hartford, New Haven and the other cities.

The action of Judge Thayer at St. Paul last week in instructing the jury to acquit President Egan of the Chicago, St. Paul & Kansas City on the charge brought by the Interstate Commerce Commission, will not be relished by the Commission, nor is it likely to be accepted as good law by those who are opposed to such manipulations by railroads. The charge, it will be remembered, was that 5,000 unlimited tickets from St. Paul to Chicago were sold to a broker at \$7 each when the legal fare was \$11.50. The defense of the company was that the tickets were limited. It appears from the evidence that the \$7 rate was lawful for limited tickets at the time of the sale, but the tickets were delivered to the broker unpunched and could thereafter be sold at any time, thus making the sale virtually one of tickets that were unlimited as regards time; but the accused officers got off on a technicality. The tickets were limited to continuous passage, and that limit was printed in the contract; and the judge holds that they were therefore "limited tickets." This means that if the rate published in the tariffs as a "limited" rate is to be construed strictly as referring to a limit of time from the date the ticket leaves the railroad company's hands, this fact must be stated on the tariff. It is said that the case of the Government was poorly presented; and if the tariffs were properly made out this may readily be believed, for, although the word "limited" has come to be used in a general sense, official tariffs generally state, or should state, clearly the number of days during which a limited ticket is valid, counting from the date of sale; and to let a ticket go out of the hands of the authorized railroad agent without the date limit upon it really makes it an unlimited ticket, for the subsequent sale by the broker is of course not recognized by the law.

The following dispatch was sent out from Chicago last week:

"An English syndicate, to be known as 'The Atlantic and Great Lakes Navigation and Trading Company (Limited)', purposes to open direct water communication for freight and passenger business between Chicago and Great Britain. The syndicate will build and operate its own vessels, for which purpose a capital of \$5,000,000 has been subscribed."

The plan is not entirely new, in fact it was proposed during the fifties, when a brig from Liverpool was in the Chicago River. The present promoter was said by the *Marine Review* of June 11 to be John D. Grant Fairfax, "who has talked a great deal about his plans for a company to run a line of steamships from the lakes to European ports, which has been the subject of a great deal of sarcasm for the lake papers, but his chances of getting a promoter's fee out of the underwriting of such a company are far better than those of his predecessors." As the steamships will, even after any enlargement of the St. Lawrence canals, have to be small enough to pass through the Welland Canal, no person who understands the situation will be apt to put any money into the project. That will have to wait until Mr. Corbett gets his ship railroad completed and the Canadians get more than 8 or even 14 ft. of water on the mire sills of the St. Lawrence canals. And even for a line of this kind on paper, it is only the Chicago genius that can calmly claim the passenger business; he only is slow enough (when writing press dispatches) to imagine that busy people will be anxious to travel from Chicago to the Atlantic seaboard at fifteen miles an hour.

The fifth case reported in our railroad law column today shows how the Maryland Court of Appeals made a railroad company pay some money for a foolish act by a conductor. He canceled a coupon by mistake and then the passenger got into trouble because the mistake was not promptly and thoroughly corrected. A good many conductors have the heedless habit which leads to these blunders. They follow the rule of the historian who wrote his books first, and then hunted up the facts afterward; they punch every ticket as soon as it gets within their reach and then find out afterward whether it needs punching or not. Of course the next conductor who handles such a mutilated ticket must, if he obey his orders, often refuse to recognize pencil-mark explanations and thus greatly inconvenience the passenger. This happens every now and then because some conductors place a strict construction upon the regulations, while others—those who make the blunders and then correct them in a slovenly manner—construe them loosely. One of these classes ought to be compelled to make their practice conform to that of the other. Which one of them had best be changed?

The temporary shutting down of the Cooke Locomotive Works from lack of orders has been made the occasion for a sensational dispatch published in the daily papers to the effect that these works are in financial difficulties. This not only has no foundation of any sort, but it happens that the hurtful report concerns a corporation that is exceptionally prosperous and has no debt or liability of any sort beyond current accounts which are paid monthly and which its bank account more than covers. The new works and valuable property at South Paterson are entirely unencumbered. Nevertheless, an injurious slander is usually fleetier than the truth which corrects it.

NEW PUBLICATIONS.

Cornell University: Its General and Technical Courses. New York. John Wiley & Sons. 1891. Price \$1.50.

This is a little book got up in a highly ornamental but not very tasteful style, apparently with the object of advertising Cornell University. This is a praiseworthy purpose, but why the book should be sold for \$1.50 we cannot see. It was distributed gratuitously at the Chattanooga Convention of the American Society of Civil Engineers. It consists of about 35 pages, each devoted to a brief description of some department of the university. Each of these is faced by a direct-process cut, from a photograph, showing a building or an interior, with a portrait of a professor. There are in addition about 35 pages of advertisements, which probably paid the cost of getting up the book, which at best is of but very passing interest.

American Manufacturer and Iron World, Pittsburgh, Pa.

The first number of the 49th volume of this periodical comes to us in a greatly improved form, the page having been reduced to 12½ by 9 in. or to about one-half of its former size. The appearance of the pages is also improved by the use of larger type and more "leads." This grateful change is particularly noticeable in the department of "trade reports," which, excepting the tabular matter, were nearly illegible. The pages, which have been increased in number, are numbered consecutively through the advertisements. This is a mistake, as the technical information in the *Manufacturer* is valuable enough to justify an index and binding.

Ealy's Blue Book: Special Credits. For July, 1891. John W. Ealy Co., New York.

This semi-annual volume contains the estimated financial worth and pay ratings of manufacturers of and dealers in railroad supplies, iron, hardware, furnishings, etc. It is especially valuable as a reference book for the exactness of the information given. Apparently libel suits are not feared, as the pay ratings number up to 126 brief statements, beginning with, "usually discounts bills," and including such information as "intemperate," "suspected of fraud," "will not answer letters," "disagreeable to do business with," etc. It is a reliable and valuable volume.

Burdett's Official Intelligence for 1891. By Henry C. Burdett, Secretary to the Share and Loan Department of the Stock Exchange. London: Spottiswoode & Co. 1891.

This, as stated on the title page, is a carefully revised précis of information regarding all British, American and foreign securities. It gives the names, the share capital, the rates of dividend and something of the organization of an immense number of railroad companies, as well as many other industrial companies. The work is one which is of frequent and very great use to anybody who has occasion to know about foreign railroads.

National Association of Builders. Report of the Fifth Annual Convention. W. H. Sayward, Secretary, 164 Devonshire street, Boston, Mass.

This Convention was held last February in New York City. The proceedings are reported in full, and a report is given of the banquet, which was a very brilliant affair, at which speeches were made by several distinguished men. These speeches are also included in the pamphlet. An appendix contains the constitution and by-laws and the names of the delegates to the Convention.

University of Pennsylvania: The Course in Civil Engineering.—This pamphlet gives a complete synopsis of the course in Civil Engineering of the University, with information as to degrees, fees, etc. There is also a list of the alumni of this department, beginning with the class of 1873. There are 166 names, and about 70 per cent. of these remain in the profession, 11 per cent. are engaged in other professions and 10 per cent. have entered mercantile life.

University of Illinois.—The catalogue of 1890-'91 shows a total of 519 students in this university, of whom 75 are women. Ninety-five of the men are in the civil engineering course, 78 in mechanical engineering and 73 in architecture. There are no women in either one of these courses. The same catalogue gives a synopsis of the work in all of these courses.

TRADE CATALOGUES.

Cement. Revised edition of a treatise presented by the Lawrence Cement Co., 67 William street, New York City.

This pamphlet gives a brief description of Rosendale cement, its character, origin and uses, with directions for mixing. It contains also a few tables of quantities and a number of testimonials.

The Loomis System of Arc Incandescent Lighting. Eureka Electric Co., 18 Broadway, New York. This pamphlet explains with some detail and a good many illustrations the Loomis system of electric lighting, and gives a partial list of the installations of that system, with a number of testimonials.

The Utilization of the Power of Niagara Falls.

What follows is about half of a very interesting lecture delivered by Dr. Coleman Sellers before the Franklin Institute, May 20. It is published in full in the *Journal of the Institute* for July:

I was in a New England town year before last spending the summer, and I was asked from New York to report upon the cost of transmitting power by electricity as compared to the cost of generating power by steam at any given location. The gentlemen who had asked this question were those who had been busying themselves with the subject that had first been proposed by Mr. Evershed, one of the surveyors of New York State, who proposed developing the power of Niagara Falls on nearly the same lines that are now being pursued by the Cataract Construction Co. for the Niagara Power Co. I was asked to take up Mr. Evershed's scheme, and having examined it very carefully I found that it was feasible, and that 20,000 horse power could be disposed of by rental out of the 120,000 horse-power that was talked of being used, a reasonable rental would pay the interest on the investment, not only on the plant that was necessary to develop the power but also of the land that would have to be purchased. On the basis of my report, which was indorsed by other engineers, a company was formed and the money secured to carry out the scheme. Mr. Edward D. Adams, of Messrs. Winslow, Lanier & Co., bankers of New York, being made the President of the company.

I met Mr. Adams in London in May, 1890, and found that he was more enthusiastic than ever in the scheme, but that he was impressed with the idea that, as there is not enough land around Niagara to use the power proposed to be developed, that is, to provide for the inhabitants, the operatives and the mill sites, it would be advisable to make the market larger by transmitting the power to a greater distance. With Mr. Adams I visited some parts of Switzerland and Paris, in the latter city to see the plan or system that had been adopted by M. Popp, who, having introduced compressed air as a means of moving the works of the tower and other clocks of Paris, had begun to supply air to and work small motors. The enterprise had increased to such an extent that eventually 120,000 ft. of pipe had been laid through the streets of Paris, and more than 10,000 H. P. might be generated by compressed air at his stations to be transmitted to drive engines from 45 or 50 to 200 H. P., and down to the smallest dental machines that are used in any establishment; and also operate the cooling chambers where provisions are kept.

In Birmingham, England, extensive works had been erected and power was being successfully transmitted by compressed air. The main thing was to find out what would be the best means of transmitting the power of Niagara Falls to Buffalo, etc., and to get at a knowledge of the exact state of the art of developing water-power as well as transmitting the power. For that purpose it was proposed to interest Sir William Thomson and make him president of a commission to consider plans to be submitted by selected engineers. Sir William Thomson many years ago said that the time was not far distant when the City of New York and other distant cities would be lighted from the Falls of Niagara.

It was decided to select Col. Th. Turrettini, the Mayor of the City of Geneva, as the representative of Switzerland, because Col. Turrettini was a noted hydraulic engineer, and it was he who had made and supervised the erection of all the improvements on the river Rhone at Geneva, whereby the individually-owned water wheels were swept away and the power of that river was transferred to all parts of the city, by pipes which convey the water from one central station, from improved pumps, worked by turbine wheels, the water being elevated to reservoirs on the hills and brought down into the town under two different pressures suited to two different classes of use that were to be served. Col. Turrettini, however, would not repeat the hydraulic plant that is now in successful operation in Geneva. In all probability, if he was called to do the work again, electricity would be the agent that he would use for transmission, because at the great falls of Schaffhausen, and other places in Switzerland where the power has been transmitted by wire rope to a number of mills, they are now substituting for their much-lauded rope transmission, electrical transmission of power, and claim to be doing it in a paying way.

Near the town of Grenoble, in France, there was a paper mill that was operated by steam. It didn't pay, and it was proposed to take water-power, about five miles off in the mountains. These mountains are inaccessible in winter. During that season it is impossible for any one to pass from the paper mill to where the wheels are placed, and they can only communicate with each other by means of the telephone or telegraph. For nearly two years this paper mill has been operated by the water of a stream in the mountains that has given them the power to run their works without the slightest interruption by one of the great storms that prevail in these mountains. They say they have now become used to it, and are so well satisfied with it that they propose duplicating their machinery to rent power, which they can do profitably at the rate of about \$30 per horse-power per annum. At that place they claim 55 per cent. efficiency by the continuous current they are using.

To co-operate with Col. Turrettini and Sir William Thomson, by the advice of many who knew him well, Prof. Mascart, of Paris, the head of the Meteorological Bureau of France and Professor of the University of France, was selected, because he is known to be well informed on the possibilities of electricity.

By great good luck, Prof. W. C. Unwin, of the Central Institute of London, Dean of the Faculty of that great school, which is intended to teach the sciences to young men under the patronage of the United Guilds of the City of London, was induced to accept the position of Secretary to the Commission, so that the Commission came to be:

Sir William Thomson, President; Coleman Sellers, Professor of Mechanics of the Franklin Institute, as representing the company and the United States; Col. Th. Turrettini, Mayor of Geneva, Switzerland, to represent his country; Prof. E. Mascart, of Paris, to represent France; Prof. W. C. Unwin, Secretary.

At early meetings of the Commission held in London, the persons were selected whose advice was deemed of great value, and these engineering firms and individuals were asked to submit plans:

(1) Of the generation of the power by turbines or other water motors.

(2) For the transmission of the power so generated to the factories on the land of the company, and then to an area within a two-mile radius from the central station. After that to Buffalo and Tonawanda, or to the area contained in a circle within a radius of 20 miles.

Not only were substantial prizes offered, but to all those who would submit plans and estimates in accordance with the specifications a sum of money was to be paid that would in some degree compensate them all for the labor expended.

The plans and estimates came in on the last day of the year 1890, but the meeting of the commission to decide on the plans was not held until the latter part of the month of January, 1891. This meeting lasted one week, and was conducted with great care and dignity, mainly in French.

All of these schemes were based on what the company has already begun, and which I will briefly explain to you.

Between the line of the New York Central Railroad as it enters the town of Niagara, and the river bank, is a strip of land averaging sufficient width to permit the laying out of a manufacturing town as an extension of the town of Niagara, with room sufficient to permit a long canal from the river to run parallel with the railroad, to enter the river below Grass Island with a diverging mouth of sufficient width to, of itself, at its lower end, give water to the Central Station to the whole amount required.

Streets are being laid out above Port Dey, where the existing hydraulic canal takes its water, for the location of mill sites, while farther up the river a large area of land, in all about 1,400 acres, will be reserved for dwellings of the operatives in conjunction with other large areas not owned by the Niagara Power Company, but being worked in harmony with it.

A tunnel requiring about 400 sq. ft. of rock excavation is being driven from above Port Dey on the land of the company under the town of Niagara to a few feet below the Upper Suspension Bridge, a total length of 6,700 ft. to be extended upstream farther, as required when the mill sites may be occupied. Only the lower end of the surface canal, as designed to feed the wheels that are to discharge into the tunnel, will be at present built, as from this point all the business will be allowed to grow upon the lines presently to be pointed out to you.

The tunnel will pass under the existing hydraulic canal that feeds the mills, which at present exist in the town of Niagara on the bank below the Falls. This canal has been in operation for about forty years, and begins at Port Dey, at the immediate head of the Upper Rapids of the American Fall. The canal passes through a reservation 100 feet wide, but is only 35 feet wide, and carries the water into a forebay parallel with the lower river, whence various factories are being fed. The whole amount of water that this canal will deliver is already exhausted so far as the power it is capable of yielding is concerned, with at present an operating efficiency of about 6,000 horse power. This power may be increased to double the amount by utilizing all the available fall, but it cannot be increased beyond that without deepening or widening the existing canal.

The question has many times been asked, why use a tunnel for a tail-race and place the mill sites above the Falls, when a more natural plan would be a duplication of that already illustrated in the hydraulic canal feeding the existing mills? I might here give a few reasons why it cannot be done. In the first place, there is no land at any reasonable price available for manufacturing purposes along the lower river.

From the head of the upper rapids to the bank of the lower river there is a fall in the ground, leaving less available head at the lower chasm than is represented by the total head between the water above the upper rapids and the water in the lower river, which is about 216 ft., while at the lower gorge it is not quite 200.

Water cannot be carried by canal at nearly so rapid a rate for use in water wheels as the tail water or waste water that runs away from them can be discharged through a tunnel of rock. For canal purposes, a velocity of not much over 3 ft. per second is the amount that is safe to use, while in an underground tunnel the velocity may be carried without serious detriment to the rock bed or to brick lining to as great a speed as 25 ft. per second. Now, it is this possible high speed in the tunnel, which does not occupy any space so far as buildings are concerned, but passes under the town through a right of way that has been granted for the purpose, that enables a volume of water to be discharged which, if it were carried by canal on the surface of the ground, would require a canal to be perhaps 400 ft. wide and from 10 to 15 ft. deep, forming of itself quite a respectable river.

The plan proposed by Mr. Evershed contemplated a number of surface canals entering the land of the company one above the other, at right angles to the river, and passing from the tunnel, which was to extend under the new town. This plan has been changed to the one canal with lateral branches that I have mentioned. The canal construction will begin at its lower end only, that the company may decide tentatively upon what is the best line of proceeding to obtain the end they have aimed at.

It has been decided that a certain amount of power will be sold for local mills that shall control their own wheels and deliver water into this tunnel. This is to satisfy those people who wish to conduct their own manufacturing establishments in the old-fashioned manner.

There will be a central station for the generation, first of about 5,000 horse power by compressed air, another one of 5,000 horse power by electricity, with the possible extension of either one of these to the amount of 100,000 horse power added in units of 2,500 to 5,000 horse power to either, one by one, in whichever direction proves the most profitable and is called for by manufacturers. The company is anxious to do this work cautiously, economically and thoroughly, and to avoid mistakes. With this intent the matter has been placed in the hands of a Board of Engineers, of which I am now the chairman, with Colonel Turrettini as foreign consulting engineer, and Mr. John Bogart, the State Engineer of New York, as consultant with me: Mr. Clemens Herschel, the hydraulic engineer of the company, and Mr. Albert H. Porter, the grandson of the one who originally owned Niagara Falls, as the resident engineer of the company at Niagara.

Niagara offers a wonderful opportunity for a water-power of a stable character, more stable than any river that has been heretofore utilized. It is not known exactly how much water there is going over Niagara Falls. There have been a great many guesses and some computations that are more or less accurate, but they differ so much that doubt is expressed in regard to all of them.

The most careful examination goes to show that the amount of water taken by the Niagara Power Company, if they find people who can use 120,000 horse power, which means a great many Lowell and Holyoke, will probably affect the depth of water passing over the

*Since this address was delivered, Mr. George B. Burbank, C. E., has been made resident consulting engineer at Niagara Falls.

Falls about one inch and no more. Hardly perceptible, when you think that a vessel loaded with timber has gone over the centre of the Horse-shoe Falls seemingly without touching. Now 120,000 horse power used on land serves a large amount of manufacturing industry. Consider, if you will, the Baldwin Locomotive Works, where over 4,000 workmen are gathered in one establishment covering five or six city blocks, and requiring all its machinery to be put in motion by steam engines with power transmitted by shafting to various parts of this scattered establishment. The 4,000 or 5,000 workmen employed in these buildings require only about 2,500 horse power of steam to drive the machinery that is giving them employment. Close by are the works of Wm. Sellers & Co., Incorporated, where 600 men are using about 300 horse power of steam; in both of these cases there are about two men to each horse power of power. But what is taking place in these establishments? They have learned that when power is transmitted from a central engine by shafting, seldom more than 50 per cent. of the power created reaches the machines, so great is the friction of the best shafting that can be made, having the best care and with the best lubrication. For small places and short transmission this may be reduced to 15 per cent., but when extended to a greater distance it eventually comes to 50 per cent. loss, and as the establishment becomes larger the efficiency of transmission diminishes more and more. A line of shafting two miles long could not, it is estimated, be turned from one end; it would twist itself off before you could turn it. In Switzerland they had the wire-rope transmission, and carried the power with much greater efficiency than by shafting for a distance of 3 miles, but this is being thrown aside for electricity.

I saw the operation that is being attempted by Ferranti in London, where he believes that by going to Deptford, on the Thames River, as business men would place a gas works, so he would place his electrical station, where he can get coal cheap, get rid of ashes readily, and obtain water for his condensing engines, etc., and though the part of London that he is to give electricity to lies at a distance of $7\frac{1}{2}$ miles from where the main station is, he aims to transmit electricity that distance underground by concentric cables at 10,000 volts. He had several breakdowns at first, but the last account that I have is that the plant is running smoothly. Mr. Ferranti is a young man, only 26 years old, but he is a very venturesome mechanician. He is putting up engines of 10,000 horse power very like such as would be used on steamships. Upon the shaft of the engine he is arranging a massive fly wheel, which is in fact the revolving armature of his dynamo, this armature being 45 ft. in diameter. He believes in steam power being developed in large quantities by large engines, but electricity in small units. The electrical machines that he strings around the rim of this fly wheel he conceives can be as well placed there as strung in a line on the floor, and can be coupled up as he may require for his purpose. He has four lines of concentric cables to carry the electricity to Grosvenor Square section of London, to a station where the voltage is reduced to perhaps 2,000 for local distribution, and then by other transformers into the houses of the district. . . . In Switzerland, by means of the oil transformers adopted by Mr. Brown, of Oerlikon, who has experimented with transmission by electricity at 30,000 volts, having a sparking distance of about an inch in the air, and by means of the so-called rotary alternating currents, they are about bringing to Oerlikon the power of a waterfall a number of miles from that place, and driving their whole establishment by electricity.

I went to Rome to see the plant there and that which is being constructed at Tivoli. The power will be brought from Tivoli to Porta a Pia at Rome by naked overhead wires at 5,000 volts, with the expectation of having at Porta a Pia about 4,500 volts to be lowered to 2,000 to enter the city of Rome by underground concentric cables, and then lowered by other transformers to enter the houses.

Prof. George Forbes was one of the first men of science to acknowledge the fact that the future of electricity looked very much as if the alternating current would be the most profitable one for transmission of power a long distance. I went with him to see the Mordey alternator at work in London, where they operated one of their generators for us as a motor, giving it work to do to the extent of 50 per cent. more than its calculated capacity without showing the least fatigue, and after half a day's work not even being warm. There was no trouble in any way with it, and it illustrated the beautiful condition of being constant in its speed, no matter whether a load was taken off or put on, for when the driving power is constant and uniform in its speed, the motor driven by it and in step with it is constant, being in no way affected by change of load. . . . The gas company of Rome concluded to create electricity by steam only as far as the coke as a by-product of their gas works would permit them to do it, but for additional supply they go 15 miles away to Tivoli to take advantage of the water power at that place and bring thence to Rome electricity at a high voltage.

The work of the Cataract Construction Co. at Niagara is now being pushed as rapidly as it can be, and it is gratifying to know that people are already looking forward to Niagara as a home. There has been leased already to one single firm for the purpose of paper mills and pulp works 3,000 horse power, and they will begin the erection of their works at once.

You may wonder why compressed air is thought of at all for transmission, as you have known in America that it has been thought to be very wasteful manner of transmitting power, but the recent improvements that have been made in compressors have very much changed the condition of that mode of transmission, and the fact that so much gain is possible by reheating the air indicates a cheap power which can be transmitted long distances with economy, dispensing with long lines of shafting.

I myself think that electricity is the most perfect and economical method of transmitting power, but people are not ready to set aside their steam engines and substitute electric motors for them at once. They will take air that can be given to them in place of steam when they find that a handful of coal will very much increase the power of that air at their works and enable air motors to be used close to the machines to be driven.

The development of compressed air at Niagara, you can understand, merits consideration when 50,000 horse power, we are told on good authority, can be carried 20 miles distant through two pipes, each 26 in. in diameter, with a certainty that by increasing the pressure for the time being, one pipe alone might carry the entire amount while the other one would be under repair; so it is not so very costly, after all, to carry power by means of it, and people can use what they are accustomed to, an elastic gas similar to steam, so that large and small

steam engines now in existence can be operated as if by steam. This is what is inducing the company to be prepared to develop its work on the three lines—one of compressed air, one of electricity, and the other of developing it on the ground by separate wheels.

TECHNICAL.

Notes.

The drop-testing machine for cast-iron car wheels, designed some years since by the officers of the Pennsylvania Railroad, is now being generally introduced in Texas and other Southern States. Its use is favored by all progressive wheel makers in the South and by Southern railroad men generally. The Marshall Car Wheel & Foundry Co. of Marshall, Tex., has been active in pushing the introduction of this machine, having found it advantageous to do so in order to show the merits of the chilled wheels made by the company as compared with those made of poorer grades of iron less scientifically mixed and poured.

The Eames Vacuum Brake Co., of New York City, has been enjoined by the Supreme Court from using an "Improvement in Valves for Pneumatic Pipes or Tubes," shown in Letters Patent No. 401,680, granted to the Campbell Printing Press & Mfg. Co. as Assignee of Edward S. Boynton. The improvement consists in providing in a hose coupling, having an external pivoted valve, a compressive helical spring inclosed within a tubular guide.

Manufacturing and Business.

The Boston & Albany has ordered "Trojan" couplers for 500 cars.

In the boiler-house of the new shops of the Pennsylvania road at Altoona a special type of locomotive boiler is employed, modified to adapt it to the use of the mechanical stoker. In connection with the Roney stoker is a complete plant of coal and ash handling machinery, and the labor in the fireroom is reduced to as low a figure as in plants where natural gas is used. The engine plant is a very complete application of the principle of subdivided power. It consists at present of two 15 H. P., one 25 H. P., two 50 H. P., Junior engines; two 5 H. P., one 25 H. P. and one 35 H. P. standard; three 35 H. P., three 65 H. P. and two 80 H. P. compound engines. Steam loops and separators are freely used where necessary to protect the engine and economize fuel. The contract for the power plant was carried out by Westinghouse, Church, Kerr & Co.

The same company has also completed a repair shop for local service at Walls Station, in which the same idea of subdivided power is carried out. One 35 H. P., one 75 H. P. and three 50 H. P. Junior engines have been built. About 35 Westinghouse engines are used by this company in various places for railroad service.

The works of the Brown & Sharpe Manufacturing Co., at Providence, R. I., will be closed Aug. 3 to 15, inclusive, for annual vacation and repairs. The office will be kept open as usual, and all orders will be promptly filled for machinery or tools usually kept in stock.

The Trethewey Manufacturing Co., of Pittsburgh, has just shipped four sets of rolls for rolling tin foil and other metals to the United States Mint and other concerns. These rolls are manufactured of the finest tool steel. This is the first shipment that has been made of this class of goods, this country previously having been supplied by the Krupp Co., of Germany. This firm has also on hand orders for its special steam hammers, one 1,100 lbs. for Algiers, La., also one 800 lbs. for Scaife Manufacturing Co., of Pittsburgh, and one of its special shears for Reeves Bros., Canal Dover, O.

The Thurmond Coupler Company has decided to change its swivel vertical plane drawhead for locomotive tenders from the design shown in the *Railroad Gazette* of June 5 last, by shortening the length from the tender bumper to the end of the hook, and also by providing an automatic return to the central position. This is accomplished by means of inclined surfaces, on which the coupler head rises as it revolves either way from the centre; the inclination being such as to cause the head to return to the central position whenever it is uncoupled. This is an improvement, and is the invention of Mr. McKeen, of the Thurmond company.

The King Iron Bridge & Mfg. Co., of Cleveland, O., has just completed the last span of the bridge across the Illinois River at Peoria, Ill., for the Peoria & Pekin Union Railroad. This bridge consists of a 125-ft. and four 150-ft. fixed spans, and a draw span 300 ft. long. The company has also just completed a four-span double-track bridge for the New York Central & Hudson River road, and also a number of spans for bridges for the Cleveland, Cincinnati, Chicago & St. Louis, and the New York, Chicago & St. Louis. Besides this work several heavy locomotive turntables have been built for the Lake Shore & Michigan Southern.

Iron and Steel.

It is understood that creditors of the Worcester Steel Works, in Worcester, Mass., have consented to accept a compromise, and that the works will soon be running again. The indebtedness is about \$1,200,000.

Bids for the construction of the South Boston Iron Works at Middlesboro, Ky., were opened last week. Leavitt & Greenleaf, of Boston, were the lowest bidders. The building will occupy several acres of ground, and when completed will cost \$200,000. The iron works make heavy ordnance.

The Bethlehem Iron Co., of Bethlehem, Pa., has been awarded the contract for making the steel forgings for the Haskell multicharge gun, and the Reading Iron Co. the contract for finishing the gun. The amount appropriated for the manufacture of this gun is \$55,000.

The American Tube & Iron Co., of Middletown, Pa., has received an order for the Matheson joint pipe from the Sandwich Islands.

The Henderson Steel & Mfg. Co., of Birmingham, Ala., is making arrangements for the completion of a second furnace and the construction of a blooming train.

It is reported from Florence, Ala., that the property of the Sheffield Land Co. and the plant of the Alabama Iron & Railway Co., of Sheffield, will be sold to an English syndicate. The property consists of three large blast furnaces and nearly two-thirds of the town of Sheffield. The price is understood to be \$3,000,000.

The Tonawanda Iron & Steel Co.'s plant at Ironton, N. Y., has been badly damaged by fire and will have to be shut down for three or four weeks. The damage is estimated at \$20,000, fully covered by insurance.

The Debardeleben Coal & Iron Co., of Birmingham, Ala., has made contracts for the sale of over 40,000 tons of iron at an average price of \$10 per ton, to be delivered

as fast as produced, the iron to go north and west. This is one of the largest contracts ever made in the district and at the lowest price.

Equity proceedings have been brought in the United States Circuit Court at Philadelphia for the Steel Patents Co. against the Pottstown Iron Co., complaining of the use by the defendants, without license from the plaintiffs, of an assigned patent in manufacturing iron and steel. The patent in controversy, it was stated, was granted to Jacob Reese, assigned by him, and reassigned to the complainants.

Proceedings were brought last week in the United States Circuit Court at Philadelphia for the Johnson Co. of Kentucky, against the North Branch Steel Co. complaining of an encroachment of an assigned patent for machines for rolling girder rails. It is asserted that the defendants, without license from the complainants, make and use the machines, and the court is asked to enjoin them from doing so.

The Berlin Iron Bridge Co.'s New Shop.

The new works of the Berlin Iron Bridge Co., of East Berlin, Conn., are now completed, and the machinery in position. They are now running full time, employing in all departments 400 men. The new shop in Cromwell is said to be one of the most complete and perfect bridge shops in this country. The building is made entirely of iron, no wood being used about the construction except for the window sash. The roof trusses are all provided with trolley cars with which to move material back and forth about the building, and three lines of narrow gauge tracks extend the entire length of the building—these three tracks being connected at each end of the building by transfer table. There is a skylight on each side of the roof, extending the whole length of the building, and for a distance of ten feet down from the eaves of the building on all sides it is made entirely of glass, so that the interior of the building is thoroughly lighted. The company has purchased a large amount of new machinery, and is now prepared to furnish all kinds of structural iron work at short notice.

American Ordnance.

Proposals for building 25 8-in., 50 10-in., and 25 12-in. breech-loaded, rifled, built up steel guns were opened by the Ordnance Department at Washington, D. C., this week. The proposals received were from three firms: the Midvale Steel Co., the South Boston Iron Works and the Bethlehem Steel Co. The bids were as follows: Midvale Steel Co.: One 8-in. type gun, \$22,028, to be delivered in three years; 25 service guns of the same pattern, at the same price each, to be delivered in eight years after acceptance of the type gun; one 10-in. type gun, \$51,880, and 49 service guns at same price each, to be delivered in eight years; one 12-in. type gun, with ammunition, \$88,502, and 24 service guns, at the same price each, to be delivered in eight years. South Boston Iron Works: One 8-in. gun, \$27,300, 24 service guns, \$20,605 each, deliveries to begin in 1894, and to be made at the rate of six per year; one 10-in. type gun, \$60,560, ammunition for the same, \$43,350; 49 service guns, \$47,700 each, to be delivered five each year after 1895; 12-in. type gun, \$100,000, ammunition for same \$60,000; 25 service guns, \$79,500 each, to be delivered five each year after 1896. Bethlehem Steel Co.: Eight 8-in. type gun, \$43,883 delivered in four years, and \$42,035 if delivered in six years; 24 service guns of same kind at \$19,723 each delivered in 552 days, or \$17,246 delivered in 730 days; 10-in. type gun, \$78,937 delivered in 639 days, or \$73,755 delivered in 882 days; 49 service guns of this size at \$40,929 each delivered in 2,130 days, or \$37,754 delivered in 3,404 days; 12-in. type gun, \$113,951 delivered in 701 days, or \$106,558 delivered in 1,095 days; 24 service guns of this size at \$61,846 each delivered in 3,194 days.

The Bethlehem bid was accompanied by some conditions. The Act of Congress gives authority to divide the awards, but, at their longest periods of time, the Bethlehem bids are still the lowest in each class, and their lowest total of \$3,785,850 for the 100 guns is the only one within the limit of the appropriation, which is \$4,225,000. The total of the Midvale bid is \$5,350,500, and the South Boston bid \$5,174,312.

Air Brakes and Automatic Couplers in Michigan. Mr. Charles R. Whitman, Railroad Commissioner of Michigan, has sent to the officers of the railroads of that state a letter, extracts from which follow:

"The following is a copy of a concurrent resolution of the Legislature of Michigan which was approved on the 16th of June. From the records of this office I am satisfied that it is the general wish of the railroad companies of Michigan that a uniform type of self-coupled and of air brakes for freight cars may be adopted upon all the railroads in the United States. . . . I take the liberty of submitting for your inspection this resolution, hoping to obtain your views with relation to the advisability and practicability of national legislation on the subject. It is my desire that the views thus expressed by you may be used in furtherance of the objects of the resolution."

The resolution is in part as follows:

"Whereas, The . . . Governor . . . did, on the 27th day of May last, transmit to the legislature, with a request for favorable consideration, the following communication from Charles R. Whitman, Commissioner of Railroads of this state: . . .

"At the National Convention of Railroad Commissioners held at Washington on the 3d and 4th of March last a committee was appointed to urge upon Congress, as soon as possible after the opening of its next regular session, the imperative need for action by that body calculated to hasten and insure the equipment of freight cars throughout the country with uniform automatic couplers and with train brakes, and the equipment of locomotives with driving-wheel brakes, and to present and urge the passage of a bill therefor. This committee was requested before presenting the bill to the appropriate Congressional Committee, after published notice, to give a hearing to accredited representatives of such organizations of railroad officials or employees as might desire to be heard. . . . Experience has demonstrated the utter inefficiency of state legislation to afford adequate protection to trainmen in the performance of their arduous duties. . . . We may compel the railroad companies doing business in this state to use some approved safety coupler; we may enforce the employment upon their cars of a power brake; but we cannot control the construction and equipment of cars by companies without the state, cars which are necessarily handled by train men in Michigan."

"Therefore, be it resolved, That the Congress of the United States is hereby earnestly requested to enact such legislation as may be necessary to insure the adoption on all railroads in the United States of automatic couplers and train brakes; or such other

legislation as may be necessary to insure the making up and running of trains without compelling railroad employees to enter between or on the tops of cars while the same are in motion."

The Hall Safety Signal for Highway Crossing Gates. The apparatus made by the Hall Signal Co. for connecting a danger signal with the gates at a highway crossing in such a way that approaching trains will be stopped unless the gatekeeper has actually lowered the gates to shut out teams, is now in use at a number of crossings on various roads, and the company has orders for the erection of signals from six different railroad companies. A Hall signal, which is held at the safety position by a closed electric circuit, is located at a sufficient distance from the crossing to give approaching trains timely warning in case it is necessary for them to stop. The electric circuit is conveyed from this by a wire to the gate at the crossing, where there is a circuit closer which automatically holds the circuit closed (and the signal at safety) when the gate is closed, and which keeps the circuit open (and the signal at danger) at all times when the gate is open. Thus a train will never have the right to approach a crossing until the gate is closed. One of the ordinary Hall bells, such as are used at crossings unprovided with gates, is also fixed at the crossing, connected with a track instrument at a proper distance, to warn the gate tender of the approach of trains.

Several fatal accidents have occurred lately at grade crossings owing to inefficiency of attendants, notably two at Chicago, and the Hall Company finds increased interest among railroad officers in its combination. The constantly increasing use of street cars also emphasizes the liability to danger at street crossings, while the use of trains of two or three cars (on electric lines) where formerly a single horse car would have been used, makes the risk in each case much greater. Failures to cut off the electric power on approaching a railroad crossing, and inability to apply it when trying to get off a crossing will be remembered as causing collisions quite recently.

Rock Depths in Broadway, New York.

Messrs. Wm. E. Worthen and W. B. Parsons, the engineers for the Rapid Transit Commission, have just concluded a series of soundings from Front street, near the South Ferry, through Whitehall street and Broadway, to Thirty-third street, for an underground railroad. The depths in Whitehall street vary from 18 to 34 ft., and coming up Broadway the depths increase to the maximum 147.5 at Worth street, then decrease irregularly to 22 ft. at Twelfth street, and fluctuate between 34 and 4 ft. up to Thirty-third street.

As it is thought the bottom of the proposed tunnel will not have to be more than 30 ft. below the grade of the street, there will be no rock cutting in the tunnel between Beaver and Eleventh streets. The soil from the South Ferry to Chambers street is a fine red sand, and north from that it is coarse, with occasional gravel and fine red sand. Through such material the tunnel can be built with the aid of a shield. From Front street to between Stone and Beaver and from Eleventh to Thirty-second street there will be the difficulty of constructing the tunnel in part rock and part earth. Above Thirty-second street there is either rock, or Broadway is so wide that there will be no danger to the houses on its sides.

Diamond Shoal Lighthouse.

The cassion built by Anderson & Barr, of Jersey City, for the proposed lighthouse on the outer Diamond Shoal off Cape Hatteras, is reported to have been wrecked during a storm which prevailed on July 9. The cassion was built at Norfolk and was towed to Diamond Shoal July 1, being about 30 ft. deep. It was expected that with a few days more of clear weather it would have been securely sunk. Capt. Anderson is in charge of the work, but no report has been received from him.

THE SCRAP HEAP.

Notes.

A cable dispatch states that at a meeting in Paris on Wednesday about 4,000 railroad employees decided to order an immediate strike throughout the lines of the five great railroad companies entering Paris.

The Iowa Railroad Commissioners, in response to a petition from the citizens of Salem, have ordered the Chicago, Rock Island & Pacific to stop the cabooses of freight trains at station platforms. The order evidently refers to trains carrying passengers.

The Southern Pacific announces that the breaks in its line near New Orleans, caused by the spring floods, have finally been repaired and double daily passenger service from New Orleans westward resumed. It is also announced that there is no prospect of any interruption of the line by reason of the overflowing of the Salton (Cal.) basin.

The grand jury at Charleston, W. Va., has taken testimony regarding the wreck on the Kanawha & Michigan road July 4, and has returned indictment for manslaughter against Patrick O'Connor, Engineer of the Train; N. P. Baker, Roadmaster; W. H. Gaffney, Assistant Engineer of the road, and O. T. Wilson, Master Carpenter. It is said that all the witnesses testified that the track was in bad condition.

Austrian and Hungarian newspapers complain of the lack of track watchmen on Turkish railroads. Nine out of ten road crossings are unguarded, and attacks by brigands on stations and signal-houses have been of frequent occurrence. Herr Von Radowitz, the German Ambassador, holds documentary evidence that since the middle of 1889 there have been 71 armed attacks upon railroad property in Turkey.

Is America a Nation of Travelers?

A Chicago jeweler received a dispatch from an old-time friend recently which read:

"Will leave for Chicago to-morrow. Meet me at train three."

As there are a half-dozen "train threes" on as many different roads entering different stations, and as several of them reach the point from which the telegram had been sent, the recipient promptly administered a gentle rebuke thus:

"As I can't meet all the train threes to-morrow, am afraid I'll miss you. But you can easily find me. I'll be waiting for you on Mr. Yerkes' grip-car No. 926."

"An hour later came the meek and business-like-like dispatch:

"Meet me at Palmer House to-morrow night at 6. Come dry." —Chicago Mail.

Multiplying Grade Crossings in Chicago.

Some of the roads at Chicago have tried to prevent the establishment of new grade crossings by throwing the

burden of keeping them safe (by gates and attendant) upon the municipality, but Judge Adams decides against them. In a suit brought for damages by the roads he holds that only nominal damages can be recovered from the city for extending streets across the tracks. As to the claim that roads should be awarded a sum equal to that required to furnish a revenue at six per cent. sufficient to erect and maintain gates, the court held that the ordinances and the general law required the construction of gates when necessary at the expense of the road; and as to the claim that the crossing would make a new danger point, that the increased risk of accident was not a proper element of compensation. In the absence of evidence as to the amount of damage, only nominal damages could be allowed. The finding of the court was that the just compensation to be paid to the defendants was \$1.

LOCOMOTIVE BUILDING.

The five decapod locomotives which the Baldwin Locomotive Works are to build for the New York, Lake Erie & Western will be of the Wootten type, with cylinders 24 x 28 in.; five pairs of driving wheels 50 in. diameter; estimated weight in working order, 177,000 lbs.; estimated weight of tender, 90,000 lbs.; boiler, 76 in. diameter, with 350 tubes 2 in. diameter and 12 ft. long; firebox, 11 ft. long by 8 ft. wide, with combustion chamber 3 ft. long; flanges to be placed on the first, fourth and fifth pairs of driving wheels, second and third pairs to be plain; driving axle journals 9 in. diameter by 10 in. long; truck axle journals, 5 in. diameter by 10 in. long. Westinghouse automatic equalized brake will be applied on all five pairs of wheels. The tender is to be eight-wheel, with 4,500 gallons capacity, and roof over the firing space.

CAR BUILDING.

The Chicago, St. Paul, Minneapolis & Omaha has recently let a contract for 50 ore cars to the Peninsular Car Co., of Detroit.

A new steel freight car built by the Harvey Steel Car Co., of Chicago, is on exhibition at the Rock Island station in Chicago. This car is built entirely of steel, except the lining and floor, which are of wood as usual. Twenty-five cars of this class were recently completed for the Chicago, Milwaukee & St. Paul, and several are now running on the Lake Shore & Michigan Southern.

BRIDGE BUILDING.

Atlanta, Ga.—The bridge and finance committees of the Atlanta Common Council have rejected the bids for the Forsyth street bridge. The bids were: Passaic Rolling Mill Co., Paterson, N. J., \$132,541; A. V. Gude and R. M. Walker, Atlanta, \$135,800; also a modified plan, \$110,300; Geo. H. Crafts & Co., Atlanta, \$147,491; Miles & Bradt, \$167,000; an additional bid from A. V. Gude and R. M. Walker, \$135,800; King Iron Bridge Mtg. Co., Cleveland, Ohio, \$151,540; Pittsburgh Bridge Co., \$170,675; Youngstown Bridge Co., \$149,448; American Bridge Works, \$147,500. The plans will be altered so that the expense will be lessened, and the bids will be re-advertised for. The bids will probably be asked for in two separate parts, one for the iron work and one for the other work. The committee desires to build a bridge at a cost not to exceed \$33,000.

Holyoke, Mass.—The county commissioners have apportioned the cost of the Holyoke and South Hadley bridge among the different counties and towns interested as follows: Holyoke, \$85,615; Hampden County, \$50,000; Hampshire County, \$17,770; South Hadley, \$9,355; Granby, \$2,500; Belchertown, \$1,500; said sums to be paid semi-annually, with interest at 3 1/2 per cent. from Jan. 1, 1891.

Indianapolis, Ind.—Over 400 of the citizens of Marion County have presented a petition to the County Commissioners asking for a new bridge over Fall Creek, on the Michigan road, which it is estimated can be built for \$10,000. The bridge will probably be used by an electric street road.

Jersey City, N. J.—The War Department has approved plans for a bridge across Newark Bay, N. J., to be built by the Jersey City, Newark & Western Railroad. It is to have two draw openings, each 100 ft. wide in the clear, and the draw spans are to be 8 ft. 5 1/2 in. above mean high water. The Government demanded 26 ft. originally, as was decided in the Baltimore & Ohio Bridge over the Arthur Kill at Staten Island.

McKeesport, Pa.—The large double-track bridge which the Pennsylvania Co. has been building across the Monongahela near McKeesport for about a year has been completed, and cars were run over it last week.

Philadelphia.—The Pennsylvania road is erecting an iron plate girder single-track bridge over the Reading Railroad between Germantown Junction and Glenwood avenue bridges. The girders are 80 ft. in length and 7 ft. high. The bridge will be 13 ft. wide, and will rest on piers of substantial masonry. The bridge will be used exclusively by freight trains going to and from the freight yard.

Washington, D. C.—Captain Rossell is preparing plans, etc., for the new iron bridge to be erected over the Eastern branch, on the Benning road, for which the last Congress appropriated the sum of \$60,000.

RAILROAD LAW—NOTES OF DECISIONS.

Injuries to Passengers, Employees and Strangers.

In Utah it is held that full fare may be collected of a passenger attempting to ride on a ticket bought of a scalper which was conditioned to be void if presented by any other than the original holder, notwithstanding the passenger purchased it on the assurance of an unauthorized agent of the company that it would be honored. The fact that the ticket was not signed by the original purchaser is of no moment, as by accepting it he was bound by its terms. Where a ticket on which plaintiff was properly not permitted to ride was taken up, but afterward returned to him, he is not damaged by the conductor's having taken it up.

In New York the Court of Appeals holds that an express messenger in charge of an express car carried upon a railroad in pursuance of a contract between his employer and the railroad company is not chargeable in the absence of actual notice with knowledge of a stipulation therein under which it is claimed that the railroad company is exempt from liability for negligently causing his death. The contract with the express company cannot operate to relieve the railroad company from the same duty to protect the messenger that it owes any other passenger or from the same liability for its negligence.

In Illinois the Supreme Court rules that where in an action by a passenger against a railroad company the negligence charged is the rapid running of the train over an imperfect track, it is competent to show the condition of the track over which the train had to pass to reach the point where the accident occurred. Where the defects in the track consist in faults of construction, evidence as to the condition of the track six months after the accident is admissible in connection with evidence showing that the track had remained substantially the same.

In Texas the Supreme Court holds that a passenger having been injured by a collision with a railroad car through the concurrent negligence of two companies, neither can recover against the other.¹

In Maryland a passenger with a round-trip ticket between W. and P. handed it to the conductor, who tore the coupons apart, and, by mistake, punched the wrong one. He then wrote upon the back of it, "Cancelled by mistake," and returned it, saying that it was all right. This was not according to the rules of the company, and on the return trip the passenger, after refusing to pay additional fare, was ejected from the train. The Court of Appeals holds that he was entitled to damages for the unlawful interference with his person and the indignity to his feelings.²

In Georgia the plaintiff entered a train at a flag station and was told by the conductor that he would have to pay four cents per mile to the next station where tickets were sold, but that he could get off the train there, and board it again, and ride the rest of the way for three cents per mile (the regular rate). When the train reached the station in question plaintiff got off and attempted to procure a ticket, but the ticket agent was not present. The Supreme Court rules that a judgment for plaintiff for damages on account of his ejection from the train, on refusing to pay four cents per mile for the rest of the way, would not be disturbed, as he had a right to rely on the conductor's statements.³

In Michigan the Supreme Court holds that the action of the runner of a switch engine in allowing it to be operated by his fireman (who has had two years' experience at such work) is not such negligence as will enable an employee to recover damages for an injury sustained while making a coupling to the engine while being so operated by the fireman.⁴

In Kentucky the Court of Appeals rules that a conductor on a freight train is a representative of the company and not a fellow-servant of a brakeman.⁵

In Michigan the Supreme Court holds that when a switchman notifies a railroad company of defects in a switch engine, and of the incompetency of the fireman operating it, and says he will quit because of such evils, but is persuaded to remain by the promise of the company that the evils will be remedied, the rule that an employee accepts the extraordinary as well as the ordinary risks of his employment when he continues in it knowing of defects which create unusual dangers, does not apply unless the company has failed for an unreasonable time to make the repairs. In determining what is a reasonable time for making the repairs and changes required, the jury should consider all the circumstances, such as the opportunity for making repairs, and the frequency with which the engine was used.⁶

In Pennsylvania an employee in the ticket department of a railroad was suspended under circumstances which, as he alleged, cast suspicion upon his integrity, and was not reinstated after an investigation which, as he further alleged, resulted in his vindication. Defamatory articles were alleged to have been published in the newspapers, based on information derived from the general superintendent. The Supreme Court rules that an action for damages against the railroad company and the superintendent would not lie.⁷

In New York, part of the duty of plaintiff, in the employ of a railroad company, was to aid in taking out of the trains defective cars, and placing them upon a particular track for repair. While attempting to couple such a car, which had a defective drawhead, he was injured. The Court of Appeals rules that the company was not liable for negligence because of such defect, as plaintiff took that risk, and had no right to assume that the cars were perfect.⁸

In Texas the Supreme Court holds that a section foreman who is being carried over a part of the road which he is not required to inspect or repair, has a right to assume that it is in a reasonably safe condition, and he does not accept risks occasioned by defects of which he has no knowledge. And the court holds that section men connected with work trains having habitually ridden in the caboose or on the flat cars as they pleased, and the company having so carried them without objection, it is not error to refuse an instruction that riding on a flat car is contributory negligence, if it is more dangerous than riding in the caboose.⁹

In Alabama, the Supreme Court rules that if a train man was verbally notified of the existence of the low bridge by which he was struck, he cannot complain that his attention was never called to any bulletin or placard setting forth the fact that there were low bridges on the line, as the purpose of the bulletins or placards is fully carried out by the verbal notice.¹⁰

In New York, the Court of Appeals decides that where a servant is injured by the failure of a fellow-servant to perform a particular duty because of his absence from his post, evidence that such fellow-servant was in the habit of leaving his post when his presence there was necessary to prevent accidents, and that the master might, by the exercise of reasonable diligence, have known of such habit, is sufficient to establish the master's negligence.¹¹

In North Carolina, in an action against a railroad for injuries to a brakeman, defendant pleaded a release of the damages due to the injury. The reply denied the execution of the release, and alleged that when it was executed it was under the impression, on plaintiff's part, that it was a receipt for wages due him, and that he was unable to comprehend the purport of the release by reason of the bodily pain and mental anxiety he was then suffering in consequence of his injuries. Held that, though there was no allegation of fraud, the reply shows matter sufficient to invalidate the alleged release.¹²

¹Drummond v. South Pac. Co., 25 Pac. Rep. 733.

²Brewer v. N. Y., L. E. & W. R. Co., 26 N. E. Rep. 524.

³J. & S. E. R. R. Co. v. Southworth, 25 N. E. Rep. 1,066.

⁴Texas & Pac. R. R. Co. v. Doherty, 15 S. W. Rep. 44.

⁵P. W. & B. R. Co. v. Rice, 21 Atl. Rep. 97.

⁶Georgia R. R. & B. Co. v. Murden, 12 S. E. Rep. 630.

⁷Thompson v. L. S. & M. S. R. Co., 47 N. W. Rep. 584.

⁸N. M. & M. V. R. Co. v. Dentzel's Adm'r, 14 S. W. Rep. 968.

⁹Litttle v. Chicago & W. M. Ry. Co., 47 N. W. Rep. 571.

¹⁰Henry v. P. & T. R. Co. (Pa.), 21 Atl. Rep. 157.

¹¹Arnold v. B. & H. Canal Co., 25 N. E. Rep. 1,064.

¹²Taylor, B. & H. Ry. Co. v. Taylor, 14 S. W. Rep. 918.

¹³Louisville & N. R. Co. v. Hall, 8 South Rep. 371.

¹⁴Coppins v. N. Y. C. & H. R. R. Co., 25 N. E. Rep. 915.

¹⁵Bean v. Western N. C. R. C. (N. Co.), 12 S. E. Rep. 600.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Central Pacific, semi-annual, \$1 per share, payable Aug. 1.

Great Northern, quarterly, 1 1/4 per cent. on the preferred stock, payable Aug. 1.

Huntingdon & Broad Top Mountain, 4 per cent. on the preferred stock and 2 per cent. on the common stock.

Illinois Central, 2 per cent. in cash, payable Sept. 1.

Lake Erie & Western, quarterly, 1 per cent. on the preferred stock, payable Aug. 15.

Louisville & Nashville, 2 1/2 per cent., payable Aug. 1.

Mill Creek & Mine Hill Navigation & Railroad Co., semi-annual, 5 per cent., payable July 15.

Mount Carbon & Port Carbon, semi-annual, 6 per cent., payable July 13.

Northeastern (South Carolina), semi-annual, 3 per cent., payable July 1.

Schuylkill Valley Navigation & Railroad Co., semi-annual, 2 1/2 per cent., payable July 13.

Wheeling & Lake Erie, quarterly, 1 1/4 per cent. on the preferred stock, payable Aug. 15.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlanta & Florida, annual, Atlanta, Ga., Aug. 11.

Atlanta & West Point, annual, Atlanta, Ga., Aug. 5.

Cincinnati, Hamilton & Dayton, annual, Cincinnati, O., July 21.

Marietta & North Georgia, annual, Marietta, Ga., Aug. 20.

Rio Grande Western, annual and special, Board of Trade Building, Salt Lake City, Utah, July 27.

Rutland, annual, Rutland, Vt., July 23.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The New England Railroad Club meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The Western Railway Club holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The New York Railroad Club meets at its rooms, in the Gilsey House, New York City, at 2 p. m., on the third Thursday in each month.

The Southern Railway Club holds regular meetings on the third Thursday of the months of January, February, March, May, September and November at such points as are selected at each meeting.

The Central Railway Club meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The Northwest Railroad Club meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The Northwestern Track and Bridge Association meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union Station, except in the months of July and August.

The American Society of Civil Engineers holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street New York.

The Boston Society of Civil Engineers holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month.

The Western Society of Engineers holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The Engineers' Club of St. Louis holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The Engineers' Club of Philadelphia holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The Engineers' Society of Western Pennsylvania holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The Engineers' Club of Cincinnati holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The Civil Engineers' Club of Cleveland holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The Engineers' Club of Kansas City meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The Engineering Association of the South holds its monthly meetings on the second Thursdays at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The Denver Society of Civil Engineers and Architects holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The Civil Engineers' Society of St. Paul meets at St. Paul, Minn., on the first Monday in each month.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The Civil Engineers' Association of Kansas hold regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The American Society of Swedish Engineers holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The Engineers' Club of Minneapolis meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The Canadian Society of Civil Engineers holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The Technical Society of the Pacific Coast holds regular meetings at its rooms in the Academy of Science Building, 819 Market street, San Francisco, Cal., at 8 p. m. on the first Friday of each month.

The Association of Civil Engineers of Dallas meets at 803 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The Civil Engineers' Association of Kansas holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p. m.

The American Society of Swedish Engineers holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The Engineers' Club of Minneapolis meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The Canadian Society of Civil Engineers holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The Technical Society of the Pacific Coast holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 p. m. on the first Friday of each month.

New England Roadmasters' Association.

The ninth annual meeting of the Association will be held at Boston, August 19 and 20. Committees have been appointed to report upon the following questions: (1) Track joints; trouble experienced with joints now in use, and points new ones should cover; (2) fences, cattle guards and railroad crossings; (3) best method of securing rails to ties, outside of joints, hold gauge on curves, spikes, braces, plates, etc.; (4) to what extent can wear of engine driving-wheel tires be allowed before general economy demands them repaired? G. L. R. French, Northampton, Mass., is Secretary.

Porters' Convention.

The Brotherhood of Railway Porters of North America held its fourth annual convention in Philadelphia last week. The officers are: John B. Taylor, Grand Master; Alexander A. Maslon, Grand Secretary; Howard N. Valentine, Grand Treasurer. The name of this organization sounds "awfully English," but it probably means sleeping-car porters.

Railway Freight Claim Association.

A meeting of the Railway Freight Claim Association of the Eastern, Western and Southern States will be held at the Hotel Vendome, Boston, Mass., on Thursday, Aug. 8. A. Meharter, of the Pennsylvania Railroad, No. 243 South Fourth street, Philadelphia, is the Secretary of the Association.

PERSONAL.

—Mr. Austin Corbin has tendered his resignation as a Director of the Central Railroad of New Jersey.

—Mr. H. C. Morgan, Superintendent of Terminals of the Central of Georgia at Savannah, has resigned.

—Mr. E. B. Thomas, First Vice-President of the New York, Lake Erie & Western, will sail from New York for Europe about July 25.

—Mr. Willard A. Smith, publisher of the *Railway Review*, will have charge of the transportation department of the World's Fair at Chicago.

—Mr. John Doyle, Superintendent of the Peninsular Car Co. since January, 1880, died at Atlantic City, N. J., of bronchitis, last week, aged 42. He leaves a wife and two sons.

—Mr. Harvey Rice, who is credited with running the first locomotive on the Concord (N. H.) Railroad, died this week, aged 79 years. He was Master Mechanic of the Concord Railroad, and subsequently Superintendent of the Ogdensburg & Lake Champlain road.

—Mr. C. N. Osgood, formerly acting Chairman of the Western Freight Association, Northern and Northwestern divisions, and lately of the Southwestern Railway & Steamship Association, has been selected as Commissioner of the St. Louis Traffic Commission.

—Ex-Senator Joseph E. Brown, of Georgia, who has been the President of the Southern Railway & Steamship Association since its reorganization about 15 years ago, has tendered his resignation upon the grounds of ill-health and inability to continue his attendance at the meetings.

—Mr. H. E. Huntington, General Manager of the New- port News & Mississippi Valley Co., has accepted the position of Assistant General Manager of the Southern Pacific and will leave for San Francisco Sept. 1. Mr. Huntington was appointed to his present position in April, 1890, when Gen. J. D. Yarrington resigned. He was previously General Manager of the Kentucky Central. He is a nephew of Mr. C. P. Huntington.

ELECTIONS AND APPOINTMENTS.

Atlanta & West Point.—Thomas J. Hunter, of Roanoke, now connected with the Norfolk & Western, has been appointed Auditor of the Atlanta & West Point road; also of the Western of Alabama, with headquarters at Atlanta, Ga.

Baltimore & Eastern Shore.—The officers of this company are now as follows: Willard Thompson, Receiver; J. M. Jackson, General Superintendent; A. W. Benjamin, General Freight and Passenger Agent and Auditor, with office at Salisbury, Md.

Brantford, Waterloo & Lake Erie.—The officers of the company are now as follows: George H. Wilkes, President; Thomas Elliott, Vice-President; J. J. Hawkins, Secretary; Robert Henry, Treasurer; A. J. Nelles, General Manager; M. Potticary, General Freight and Passenger Agent, with office at Brantford, Ont.

Chicago & Western Indiana.—F. C. Doran has been appointed Engineer and General Roadmaster for this road and the Belt Railway Co. of Chicago, vice John W. Clarke, resigned.

Cincinnati, Portsmouth & Virginia.—Thomas D. Rhodes has been relieved of the General Passenger Agency at his own request. The passenger and freight departments have been consolidated, and will be under

the supervision of E. F. Gray, with the title of General Freight and Passenger Agent.

Cleveland, Cincinnati, Chicago & St. Louis.—Henry Waite, nephew of President C. C. Waite, of the Columbus, Hocking Valley & Toledo, has been appointed Engineer of Maintenance of Way of the St. Louis division of the road.

Covington, Flemingsburg & Ashland.—The officers of the re-organized company are as follows: W. W. Franklin, President; Watson Andrews, Vice-President; N. S. Dudley, Superintendent, with offices at Flemingsburg, Ky.

Duluth & Dakota.—The company last week filed amended articles with the Secretary of State of Minnesota. The following directors have been elected: L. L. C. Brooks, William Rhodes, John T. Crowley, Lyle M. Fisher and Howard H. Cleveland.

East Louisiana.—At the annual meeting at Covington, La., the following officers were unanimously re-elected: John Poitevent, President; Joseph A. Favre, Vice-President; P. A. Orr, Secretary and Treasurer. E. Martelli and S. R. Poitevent were re-elected members of the board.

Erie & Huron.—At a recent meeting of the board of directors, held in Toronto, Edward Hastings Bickford was elected a member of the board, and subsequently President of the company, vice E. O. Bickford, deceased.

Evansville, Newburg & Suburban.—A meeting of the stockholders of the company was held last week at which a Board of Directors were elected, as follows: F. W. Cook, Lee Howell, D. J. Mackey, Judge W. J. Wood C. F. Hopkins, Joseph Cox and A. Muhlhausen, Evansville, Ind.

Gainesville, Rocky Point & Micanopy.—The officers are: President, J. W. Carter; Vice-President, James M. Graham; Secretary, J. B. Martin; Treasurer, Thomas McCredie, and General Manager, A. J. Sherford. The principal office is at Micanopy, Fla.

Georgia Midland & Gulf.—J. M. Saunders having tendered his resignation as Auditor, W. B. Moore has been appointed to succeed him.

Grand Tower & Carbondale.—Robert Bell having resigned as Traffic Manager of this company, the office has been abolished. Edward Brown has been appointed General Freight and Passenger Agent, with office at the Granite Building, St. Louis, Mo.

Great Western.—The following officers were elected last week by the incorporators: J. H. Bacon, President; Witcher Jones, Vice-President; F. L. Holland, Secretary, and H. M. Bacon, Treasurer. The principal office is at Salt Lake City.

Jacksonville Southeastern Line.—D. W. Rider has been appointed General Superintendent of this line, with office at Jacksonville, Ill.

Lake Shore & Michigan Southern.—A. B. Newell, son of President John Newell, has been appointed Assistant Trainmaster on the Franklin division. This is a new office.

F. H. Soule has been appointed General Car Inspector for this company, in place of G. N. Dow, promoted.

Louisville & Nashville.—John E. Burke has been appointed General Eastern Agent of the road, with headquarters in New York, vice William M. McGibney, deceased.

Mexican International.—Horace M. Gibson has been appointed Assistant General Freight and Passenger Agent, vice Adam Hoffman, resigned.

Mexican National.—Adam Hoffman has been appointed General Freight Agent, vice R. H. Vaughn, resigned, who goes to New York as General Eastern Agent of the Monterey & Mexican Gulf road.

Norfolk & Western.—Thomas Pinckney has been appointed General Eastern Agent, with office at No. 303 Broadway, New York, in addition to his duties as General Eastern Agent of the Virginia, Tennessee & Georgia Air Line.

North Carolina.—The directors of the company at a meeting last night re-elected W. F. Korregay, of Greensboro, N. C., President of the road, and P. B. Ruffin, of Hillsboro, Secretary and Treasurer.

Pueblo & Duluth.—The following are now the officers of this company: President, D. Hitchcock, Clearwater, Neb.; Vice-President, James Hunter, New York; Treasurer, Wm. A. Winant, New York; Secretary, Thos. Marwood, New York, and Chief Engineer, L. F. Wakefield, Sioux City, Ia.

Richmond & Chesapeake.—The following were the directors elected at the recent meeting at Richmond, Va.: N. E. Reed, H. R. Baltzer, E. V. Baltzer and Ellis R. Southworth, New York City, and C. E. Belvin and C. O. Swann, Richmond, Va. N. E. Reed is President, C. E. Belvin, Vice-President, and Herman R. Baltzer, Treasurer, 50 Exchange Place, New York.

Richmond & West Point Terminal.—It is said that the company has decided to remove its general headquarters from Washington to Atlanta. The change will be made at once, and will affect the General Manager, General Passenger Agent, Traffic Manager and Treasurer, and the force under them will be removed here. This, however, is not to affect the division officers of the Central of Georgia and the Richmond & Danville roads, whose respective headquarters will remain in Savannah and Richmond. Patrick Calhoun has been appointed Vice-President, and will be chief executive officer at Atlanta.

Saginaw, Tuscola & Huron.—Wm. H. Hart has been appointed Treasurer of this company, with office at East Saginaw, Mich.

St. Louis, Kennett & Southern.—Louis Houck, of Cape Girardeau, Mo., has been elected President. A. J. Kerfoot has been appointed General Superintendent of the road, vice H. H. Ferguson.

Savannah, Americus & Montgomery.—The annual meeting was held in Americus, Ga., July 9. The old board of directors was re-elected, with the exception that W. E. Hawkins filled the place of James Fricker, deceased, and John Windsor, Americus, and Judge D. B. Harrell, Richland, succeeded two retiring directors. The office of Second Vice-President was created, and W. E. Hawkins was elected to fill it. He is the son of President Hawkins.

South Brunswick, Atlanta & Northwestern.—William D. Wheelwright, James O. Bloss, George T. Dixon,

Herbert Richmond and William M. Walton, of New York City, are the projectors of this company, which will ask for a charter to build from Waynesville to Fort Valley, Ga., at the present session of the state legislature.

Tavares & Gulf.—L. A. Koehne has been appointed Auditor and Assistant General Freight and Passenger Agent of this company, with office at Orlando, Fla., vice R. B. Foss, resigned.

Union Pacific.—H. E. Van Housen has been recently appointed Assistant Superintendent of the Utah & Northern division, with office at Pocatello, Idaho.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Atlanta, Southern & Western.—The company has applied to the present Georgia Legislature for a charter for a road to extend from Savannah to Atlanta and thence southwest about 60 miles to a point in Randolph County, Ala. Branches are to be built from a point east of Atlanta, southeast to Waycross and Darien, and also northeast to Port Royal or Charleston. The incorporators are C. A. Evans, F. P. Rice, W. A. Hemphill, H. L. Wilson and B. W. Hall. The Georgia, Virginia & Baltimore has been organized by the same directors.

Baltimore & Ohio.—The company has let the contract to J. DeGrau & Co. to build the first two miles of the branch road from Linden to Connecticut avenue in Washington, D. C. This is to be finished by Sept. 1. The company will do the tracklaying. The new line will run from Linden, on the Metropolitan division, and cross the Potomac River to make a junction in Virginia with the Virginia Midland division of the Richmond & Danville.

Blue Island.—Articles of incorporation of the company were filed in Illinois July 7. The road is to be constructed from the village of Blue Island, Cook County, to the town of Calumet, on the Michigan Central road. The principal office is to be in Chicago. The capital stock is \$25,000, and the incorporators are Josiah B. Crocker, E. M. Warren, Wm. J. Haerther, Henry Biehl and Harry M. Packboen.

Boston & Maine.—In addition to the double tracking on the eastern division, from Ipswich to East Salisbury, Mass., 11.15 miles, described last week, the company expects to complete the double tracking of the Saugus Branch, 9.55 miles, this season; 3.72 miles of this work was completed last year. On the western division the second track has just been completed on the 3.90 miles from Dover to Salmon Falls, N. H., and the company expects to complete the work from Exeter to South Newmarket Junction, N. H., 4.91 miles, also revising and straightening the line.

Boynton & National Park.—The route of this road, recently chartered to build a line about Chattanooga, is given as follows by one of the officers: Beginning at Harrison it is to extend to Graysville, Ga., thence via Boynton to a connection with the Chattanooga, Rome & Columbus at Rock Springs, Ga., and from there to a connection with the Chattanooga Southern. Cutler Smith, of Boynton, Ga., is a director.

Brandon Southwestern.—A survey was begun this month for a line from Brandon, Man., on the Canadian Pacific, southwest to the Turtle Mountains and to a connection with the Great Northern at Bottineau, N. D. The route is via Nipawka and Deloraine, Man., and is about 75 miles long.

Burlington & Missouri River.—Trains are now running over the branch of the Deadwood line, which has just been completed, from Minnekahta, east to Hot Springs, S. D., a distance of 13 miles. The extension northwest of Mervin, Wyo., which was built this year to the Belle Fourche River, a distance of 20 miles, has been opened to that point, the station being called Moorcroft.

Kilpatrick Bros. & Collins are now at work extending the tracks around Newcastle, Wyo., where the company has extensive coal mines.

Central of New Jersey.—The engineers are now surveying for a new route to replace the Sandy Hook terminus of the Long Branch road, which will be abandoned after Oct. 1, under orders of the War Department. Two routes are proposed, one inland to the Shrewsbury River, and the other by Atlantic Highlands and Hilton Dock, crossing the river at Highland Beach. It is thought here that the decision will be in favor of a terminus at Atlantic Highlands pier.

Charleston & Northern.—It is proposed to begin surveys in a few weeks at Charleston, S. C., for this road, recently chartered in South Carolina. The line is said to be projected to extend northwest via Eutawville to Camden, S. C., a distance of 150 miles, which would parallel the South Carolina road. A. W. Taylor, of Summerville, S. C., is one of the projectors.

Chicago Lake Street.—The stockholders voted to increase the capital stock of the company from \$3,000,000 to \$5,000,000, to cover the expense of proposed extensions. The company has not been able to float the \$3,000,000 in bonds already authorized, but a plan is now proposed by which the company hopes to raise the necessary funds for construction by private subscriptions to its securities in Chicago.

Chicago, Union City & Cincinnati.—A subscription of about \$25,000 was voted by Wayne Township, Ill., at an election held last week. A similar subscription being a one per cent. tax was defeated in Jackson Township. The latter subscription would only have amounted to \$6,000, and it is stated that its defeat will not affect the building of the road. The line is to extend from Union City, in Wayne Township, northerly through the eastern part of the state to Huntington, a distance of about 70 miles.

Cincinnati & Michigan.—The company was incorporated in Ohio last week. The capital stock is \$10,000, and the road will extend from Franklin, Warren County, north through the western part of the state to a point in Williams County where the Cincinnati, Jackson & Mackinaw road crosses the state line. The headquarters are at Van Wert, O.

Duluth Transfer.—The mortgage for \$2,000,000, in favor of the Metropolitan Trust Co., of New York, recently recorded at Duluth, is a first mortgage to secure an issue of 30 year bonds bearing six per cent. interest, which are to be issued to complete the terminal line from Duluth to Fond du Lac, along St. Louis Bay and River. It is proposed to apportion the amount raised by the bonds in the following manner: \$400,000 for a union station in Duluth; \$350,000 for wharves, and \$34,-

000 for building and equipping each mile of single-track road, and \$16,000 per mile extra for a second track.

Duluth & Winnipeg.—Grading has begun on the Rainy River branch line which is to be built to reach the timber lands of the Itasca Lumber Co., along Rainy River and near the head of the Mississippi River. The road will connect with the main line at Bass Brook, about six miles west of Grand Rapids, Minn.

The surveys have been completed for about 20 miles on the second lumber extension which is to be built from near Swan River station to a point in St. Louis County, near the headwaters of Swan River, and also in the opposite direction southwest across the Swan River to a point near its mouth in the southern part of Itasca County, Minnesota. It is expected to have 28 miles of this line in operation next fall. It is to be built to transport the timber from the St. Louis River across the divide to the Mississippi River so that timber can be floated down the latter river to St. Paul and Minneapolis.

Fidalgo City Belt Line.—The contractors have cleared the right of way for the greater part of the distance from Fidalgo City, Wash., and King & Dickinson, of Tacoma, who have the contract, have just commenced the grading. The work is progressing favorably and will probably be completed before September.

Gainesville, Rocky Point & Micanopy.—About 150 men are now grading on this road between Gainesville and Micanopy, via Rocky Point, Fla., a distance of 12 miles.

The contractor is N. A. Callister and he expects to complete the road about Nov. 1. The grade is very light, but there will be a trestle nearly 9,800 ft. long across Ahua lake. The company which is building the line has been formed by a number of orange growers along the route, and enough money has been subscribed to grade the line. The road will probably be mortgaged to pay for the rails and rolling stock, or an arrangement will be made with the Florida Central & Peninsular or Florida Southern by which one of those roads will complete and operate the new line. A. J. Shuford, of Micanopy, Fla., is the General Manager.

Georgia, Carolina & Northern.—The track on this road was laid into the corporate limits of Athens, Ga., July 10, and the construction trains are now running as far as the east bank of the Oconee River. On July 1, the track had been laid from the Savannah River for 34 miles to a point beyond Elberton on the South Broad River. The line has been graded to a point beyond Lawrenceville, Ga., about 20 miles east of Atlanta, and 50 miles west of Athens.

Georgia Roads.—A number of railroad bills have already been introduced at the session of the Georgia Legislature which began last week. Among others are the following: to incorporate the Atlanta & Western, and Georgia, Virginia & Baltimore, to build from Atlanta northeast, the incorporators being C. A. Evans, W. A. Hemphill, of Atlanta, and others; also, to change the name of the Indian Springs Railroad to the Indian Springs & Flavilla.

Great Northern.—The contract for grading and bridging on about 50 miles of the Pacific extension is said to have been let to the San Francisco Bridge Co. The contract is along the Pend d'Oreille River from Sand Point, Idaho, westward. The grading will be begun immediately at Sand Point by a force of 600 men.

The track on the Pacific extension has probably been laid this week into Two Medicine, 22 miles from the mountain summit, as a few days ago it was within five miles of that point. It is thought that the line now completed will be turned over to the operating department in a few days.

Illinois Central.—At what is described as "an enthusiastic meeting of 75 of the leading citizens" of Natchez, Miss., this company was invited in a series of resolutions to build into that town from near Brookhaven, about 75 miles east of Natchez. The same resolutions promise right of way through the town and east of it.

Kansas City & Independence Air Line.—The grading on this line from Kansas City to Independence, Mo., has just been commenced by Smith & Bradbury, of Kansas City, the contractors for the grading and pile bridging. The route is from a point on the Kansas City Suburban Belt, near the mouth of Blue River, northeasterly to Independence, a distance of about 5½ miles. The location of the line has been practically completed. A. A. Mosher, of Kansas City, is President, and J. W. Heylman is Chief Engineer.

Knox & Lincoln.—A new survey is being made by Messrs. Tripp & Hilton for the Camden extension along P nobscot Bay. The engineers are now surveying through Rockland, and it is stated that they have decided to abandon the project of using the tracks of Lime Rock road through the town. The survey north of Rockland to Camden will probably only be slightly altered.

Lake Jessup, Indian River & Atlantic.—The locating survey now being made for this road by J. O. Fries is more than half completed, and the engineers expect to finish the survey this month. The contracts for grading will probably be let as soon as the surveys have been made. The road is to be constructed from Lake Jessup, in Orange County, in a southeasterly direction through Ovidio, Lake Charon, Chulubots and Fort Christmas, thence east crossing the St. Johns River at Long Bluff to near Hardeeville, then southeasterly about half a mile back from Indian River through Sharps, City Point, Cocoa and Rock Ledge to Coquina, Fla., on the Indian River. Connections with steamer will be made at Ovidio and Coquina. The route is through a practically level country, and there will be only two bridges to build, one across the St. Johns River being a draw. The length of the road will be 45 miles. It will be through an orange-growing country. The line is to be built by a Chicago company. C. M. Lewis, Rookery Building, Chicago, is President, and J. Emmet Brown, Ovidio, Fla., is General Manager.

Louisville, New Albany & Chicago.—The directors have recently decided to build a new branch of the line from Birney, Ind., south a distance of about 25 miles to several of the coal mines in the northern part of Clay County.

Macon, Dublin & Savannah.—The track has been laid into Dublin, Ga., 54 miles east of Macon, and the rails are now being laid through that town and 1½ miles beyond it to the Oconee River, across which an iron bridge is to be erected.

Mississippi Central Valley.—The contract has been let for building the 6½ miles of this road between Rosedale, Miss., and Bogue Phalia, which was surveyed in the latter part of last year. The grading is to be com-

pleted between these points at once, and the line may then be extended northwest to connect with the Louisville, New Orleans & Texas. Preliminary surveys have been made for part of this extension. Charles Scott, of Rosedale, Miss., is President.

Mississippi & Little Rock.—The contractor now has about 12 miles of the track laid on this road from near Aurich, on the St. Louis, Arkansas & Texas, west towards Little Rock, which is about 47 miles from that point. About 50 men are now employed on the line at present and these are laying the rails towards Bakers Bayou, through Grand Prairie. It is expected to continue the work uninterrupted until the track has been laid to this point. The grading has been completed for 40 miles and the ties distributed for 35 miles and the bridges erected for about 20 miles. It is expected to open the first 30 miles of the road to Bakers Bayou, about Aug. 1, the terminus being in a tract of virgin timber consisting of oak, hickory, cypress and other hard wood.

Nashville & Knoxville.—The award of the contracts for the extension east of Cookeville, Tenn., has not yet been made, as recently reported, but it is expected that the work will be let about July 20. The locating survey has been completed on the 10 miles from Cookeville, which it is proposed to put under construction this summer. The first five miles of this line, to the foot of Cumberland Mountain, will be light work. The line up the mountain will have a maximum grade of 100 ft. to the mile and nine-degree curves. Although contracts for only 10 miles of the road will be let this month, it is proposed to build 18 miles of road before the close of the year in an easterly direction from Cookeville to Standing Stone, which is on Cumberland Mountain and in a large coal belt. The contracts will be awarded by A. J. Crawford, the President and General Manager, at Terre Haute, Ind.

New Roads.—W. A. Fletcher, President of the First National Bank of Beaumont, Tex., who is the projector of a road through eastern Texas from Sabine Pass and Beaumont north through the counties between the Sabine and Neches Rivers to Marshall, is said to have interested Kountz Bros., bankers, of New York, in the scheme. The route is through heavily timbered country, and reaches iron ore in Cherokee County and granite in Jasper County. Right of way and subsidies have been voted at many places along the line. Construction work will not begin until the fall.

Articles of incorporation are being prepared for a road which it is proposed to build from Kennon, Wis., on the "Soo" line west of Prentice, northeast about 15 miles to Phillips, on the Wisconsin Central.

It is reported that a road will be built from Goshen, Va., to Walker's Valley, a distance of 10 miles, by the Goshen Land & Improvement Co.

The Arcadia Lumber Co. proposes to build a road to timber lands 12 miles northwest of Arcadia, La.

The Tyler Star Lumber Co., of Tyler, Tex., will, it is proposed, build a road from Gilmer to a connection with the Marshall, Paris & Northwestern line.

The Roanoke Land & Lumber Co. may build a road from Shiloh, S. C., to a point on North River.

Surveys have been made for a suburban line north of Salt Lake City, Utah, to Bountiful and Centreville, about 11 miles, but for about two-thirds of this distance a road has been built. The grading on the balance will begin next week. It is proposed to complete the line to Hot Springs.

New York, Philadelphia and Chicago.—The chief engineer has begun the location of the line from Franklin southeast to Clearfield, Pa., about 90 miles. Work will soon be commenced on the Franklin end of the line. When completed the road will connect at Franklin with the Lake Shore Michigan Southern, and near Clearfield with the Beach Creek line. Charles Miller, of Franklin, Pa., and Julius E. French, of Cleveland, O., are directors.

Norfolk & Western.—Bids for grading and tracklaying on the Roanoke belt line south of the city will be awarded in a short while. The line begins at Vinton, and goes around the southern part of the city to the West End furnace, where it rejoins the railroad. It will be nine and a half miles long.

Northern Pacific.—About 74 miles of the Missoula line, from De Smet to St. Regis Station, Mont., has been transferred to the operating department, and is now being operated as the De Smet & Rivulet branch. The principal stations are Frenchtown, 11 miles from De Smet, Lothrop, 25 miles, Rivulet, 42 miles, and St. Regis, 74 miles. The balance of the line, which is 120 miles long, has not yet been turned over by the construction department, but trains have been running over the greater part of the distance for some time. A tunnel through the Bitter Root mountains near Missoula has delayed the final completion of the line. The branch extends from Missoula, Mont., and Hunter's Concentrator (Mullan) Idaho, leaves the Northern Pacific line at De Smet, seven miles west of Missoula, and extends down the Missoula River and up the St. Regis De Borgia 100.5 miles to the Idaho boundary, connecting with an extension of the Cour d'Alene Railroad & Navigation Co.'s road 11 miles from Hunters. The construction work is heavy, the maximum grade being four per cent., maximum curves, 16 degrees. There are a number of bridges and trestles, one tunnel, but none of any great length.

A contract for blasting and other work on the Cascade division from Pasco to Cascade, Wash., has been awarded to Greenough & Massey, of Missoula, Mont. They will fill in with earth the roadbeds under 72 bridges, at an estimated cost of over \$70,000. John Wallace, of Tacoma, has been awarded a contract for improvements at Lester, on the Cascade division near the foot of the Cascade mountains. A new roundhouse, engine-house, station, large coal bunkers and over two miles of sidetrack will be constructed. The improvements will entail an expenditure of \$80,000. The work let to Greenough & Massey is a continuation of work started in the spring on the Pacific division. The line has been ballasted this year, and trestles and small bridges filled in from Tacoma to within four miles of Seattle. The work is now in progress between Globe and Portland, Or., and it is expected that it will be completed early next fall. Ballasting will soon begin on the Chehalis extension, and the bridge in Centralia filled under with rock and earth. The long trestle between Chehalis and Centralia will also be strengthened.

The branch from Olympia to Harlowe Junction, Wash., 20 miles, will be turned over to the operating department within a few days. This completes the Tacoma, Olympia & Gray's Harbor line from Tacoma to the junction with the new Centralia-Ocosta branch. The section of this latter line from Montesano west to Ocosta, Wash., 25 miles, will be in operation in August. It is stated that

this line will be extended about 18 miles from Montesano to Gray's Harbor City. Part of this distance has been graded. About 600 men are working on the South Bend line between Chehalis and South Bend, on the coast. The track on the Lake Washington belt line will probably be laid into Kirkland, Wash., from the north this week.

Paris, Choctaw & Little Rock.—The directors have recently concluded an arrangement with C. B. Woodbridge to complete part of this projected road from Paris, Tex., north, to the Red River and toward Little Rock. Mr. Woodbridge states that the grading will be resumed near the Red River in the fall.

Plymouth & Bourne.—Charles M. Thompson began last week a new survey for this line across Plymouth County, from Plymouth to Bourne, Mass., 16 miles.

Pueblo & Duluth.—Two parties of engineers are now in the field making surveys for this line through northern Nebraska. The company proposes to place another party in the field this week. The surveys are being made in as direct a line as possible from Sioux City southwest. One corps of engineers is also surveying from Pueblo northwest to connect with the line through Nebraska. The surveys have been made south from Sioux City north to Ponca, about 18 miles, and west through Martinsburg to Clarion and thence along the Logan Valley parallel to the Pacific Short Line to Randolph on that road, about 50 miles. The route of the survey beyond that point has not been decided upon but will probably be to Nellie, about 40 miles southwest of Randolph.

Rio Grande Western.—The new Sevier Valley branch south of Thistle, Utah, was changed to standard gauge this week. The line has only just been built between Manti and Salina, 20 miles. The new stations are Sterling, Gunnison, Willow Creek and Salina. In addition to opening up a new line to a number of important towns in San Pete and Sevier counties, the rich Marys Valley mining district is brought about 30 miles nearer to railroad communication than heretofore. The branch is to be extended to the latter point.

W. A. Stratton, of Springville, Utah, has been awarded a contract for grading on the line from Springville to the Tintic mines.

Roanoke & Southern.—The construction work on the second division of the road, from Martinsville to Roanoke, Va., 60 miles long, is being rapidly pushed. This division is about four-fifths graded, and the work of laying rails is going on at the rate of one-half mile a day from Roanoke to Rocky Mount, and from Martinsville north. The entire route to Roanoke will be completed in the fall.

St. Louis, Kennett & Southern.—It is stated that the control of this line has been transferred to Louis Houck, President of the St. Louis, Cape Girardeau & Fort Smith. The road now extends from Campbell south to Kennett, Dunklin County, Mo., a distance of 15 miles. It is proposed to extend the line toward Memphis, Tenn., the surveys having been made for that part of the distance last fall.

Salt Lake, Colorado & Gulf.—J. H. Hanna, of Cortez, Col., one of the directors, states that it is proposed to begin grading in October, and to build from Fort Wingate, N. Mex., north a distance of 55 miles, toward Cortez, Col. Already \$400,000 has been subscribed to build this portion of the line. The line has been surveyed for 210 miles through the Montezuma Valley which it is estimated will give a large local traffic, as well as in coal, sandstone, and timber. The road, as stated last week, will extend from Fort Wingate through Farmington and the Navajo Indian Reservation to Cortez, La Plata County, Col.

San Antonio & Aransas Pass.—The track of the Waco section, on which the construction was recently resumed, has already reached Rockdale, 15 miles north of Lexington, and unless interrupted the contractors will lay 1½ miles of track daily. The line will probably be finished in August, and trains will be running before the end of September over the entire extension to Yoakum on the main line, 160 miles south of Waco. The line now under construction to Lott, a few miles south of Waco, is 65 miles long.

San Antonio & Tampico.—The preliminary surveys of a proposed extension of the San Antonio & Aransas Pass to Monterey, Mex., are nearing completion. The line will be about 150 miles long, and is to extend from the Rio Grande River at Alice, Nueces County, Tex., to the northern terminus of the Monterey & Mexican Gulf. Uriah Lott, President of the San Antonio & Aransas Pass, states that the capital to build the line has been subscribed and that grading will begin in September.

Savannah & Isle of Hope.—The tracklaying on the road is nearly completed as far as Thunderbolt, near Savannah. The rails have been laid to within a short distance of that place, and by July 20 the road will be ready for use as far as that point.

Seattle & Montana.—Mathews & Kreh, of Seattle and Minneapolis, have been awarded a contract for surfacing, ballasting and tracklaying 60 miles of road to Sedro, Wash. The last report of the tracklaying stated that 36 miles had been laid north of Seattle to a point six miles beyond Mukilteo to the first bridge on the Snohomish River. The track will probably reach the Stillaguamish River, 52 miles from Seattle, by July 20. Work is also to be commenced on the roadway from Boulevard, along Railroad avenue, in Seattle, to the centre of the city. It is believed that by Sept. 1 through trains will be run to Seattle from the boundary line, over the Fairhaven & Southern as far as Sedro. Beginning at Seattle, the stations will be at Boulevard, Ballard, Richmond Beach, Edmonds, Mukilteo, Port Gardner, Stanwood, Mount Vernon, Burlington and the junction with the Fairhaven & Southern, near Jarman Prairie.

Snohomish, Skykomish & Spokane.—King & Dickinson, of Tacoma, Wash., will probably build this projected road, an arrangement with them to that effect being about completed. The line is to extend from Snohomish, near the line of the Seattle, Lake Shore & Eastern, to Puget Sound at Port Gardner or Everett. The Northern Pacific is not interested in building the line as reported.

Toledo, Ann Arbor & North Michigan.—The Chief Engineer reports the completion of the locating survey on about 30 miles of the Mackinaw extension from Marion, Oscoda County, Mich., on the main line, north to the Manistee River. The location is being made by H. E. Riggs, Chief Engineer. The preliminary surveys have been completed to Charlevoix and Mackinaw, a

distance of 90 miles. The letting of contracts for grading has been postponed, and it is now unsettled when the company will begin to construct the line.

Toledo & Chicago Bee Line.—Donald McLean, who has been elected President of this road, told a reporter in Chicago this week that construction has begun at Pioneer, Ohio, and grading "will be pushed vigorously both ways and the line completed by January. The right of way cost but \$44,000, and requires very little grading. The completed road will cost less than \$20,000 a mile, and the most of this has already been guaranteed in bonuses." From Chicago to Toledo the route is nearly directly west, passing through the Lafayette terminus of the Lake Shore & Michigan Southern, and through Goshen, Ind., to Hammond, near Chicago.

Wadena & Park Rapids.—About 300 men are now working on the construction of this road, and the track is being laid rapidly to Park Rapids, Minn. Since the tracklaying was commenced, June 15, the track has been laid to a point 12 miles north of Wadena, being 31 miles north of Eagle Bend, the southern terminus. The whole length of the line is 55 miles, and the contractors will have the track at Park Rapids by August. The road commences at Eagle Bend, in Todd County, and extends north through Wadena to Park Rapids, in Hubbard County, Minn. The grading and bridging has been completed.

Western Maryland.—Work upon the Williamsport branch of this road, which is to connect at Cherry Run, Md., with the Baltimore & Ohio and by this means give the Philadelphia & Reading a through line to the West over the Baltimore & Ohio, and the latter system an outlet in eastern Pennsylvania, is making rapid progress. The grading has been in progress a number of weeks.

Wheeling & Lake Erie.—The extension along the Ohio River from Portland, south to Martin's Ferry, O., seven miles, will probably be opened for regular traffic in a few days. The line was hastily built last December, and the ballasting and other work has delayed the transfer of the road to the operating department.

The double track on the Toledo Belt Line to Manhattan Junction on the main line, about two miles south of Toledo, O., has just been completed.

GENERAL RAILROAD NEWS.

Boston, Winthrop & Shore.—The stockholders of this company at a meeting at Boston, July 9, ratified the proposed consolidation with the Boston, Revere Beach & Lynn, which had been previously voted on by the stockholders of the latter company.

Central Vermont.—The company has entered into an arrangement by which it is to operate temporarily the Montreal, Portland & Boston road between Farmham, Que., and St. Lambert, connecting at that point with the Grand Trunk. The line has heretofore been operated by the Canadian Pacific. The transfer was made this week.

Denver & Rio Grande.—It is stated that it is the purpose of the company to pass the next dividend on the preferred stock, due next month. The last dividend was 2½ per cent. in cash, paid last February. Since then the earnings have fallen off and the company has not earned money for a dividend. The directors have decided not to pay out in dividends any money that has not been earned and applicable for that purpose.

Gettysburg & Harrisburg.—A meeting of the stockholders of the road will be held on July 30 for the purpose of acting upon an agreement for the merger and consolidation of this road and the South Mountain Railway & Mining Co.

Great Northern.—The earnings of the company for June were as follows:

	1891.	1890.	Inc.
Great Northern	\$815,351	\$755,449	\$59,902
Montana Central	111,112	107,841	3,271
Eastern of Minnesota	99,780	54,816	44,964
Total	\$1,026,243	\$918,106	\$108,137
For the year ending June 30:			
Great Northern	\$10,555,479	\$9,325,605	\$1,229,894
Montana Central	1,277,613	985,164	29,449
Eastern of Minnesota	828,738	735,025	93,713
Total	\$12,661,850	\$11,045,794	\$1,616,056

Kansas City, Wyandotte & Northwestern.—A foreclosure of the mechanics' lien case of Kilpatrick & Collins, railroad contractors of Beatrice, Neb., against the Kansas City & Beatrice and the above company has been concluded in the District Court at Kansas City, judgment being rendered for \$29,500. The suit was mainly to establish priority of liens on the property. The Kansas City, Fort Scott & Memphis also secured judgment for \$33,864, and the New York Security Co., party defendants, judgment in the sum of \$278,267. A decree of foreclosure was ordered. The security company has filed its notice of appeal.

Kansas & Colorado Pacific.—Suit has been begun in the United States Circuit Court, at Omaha, Neb., by this company against the Fitzgerald & Mallory Construction Co. for \$3,000,000. The petition alleges that the defendants fraudulently obtained control of the road, and converted to their own use money subscribed by towns and counties in aid of the road. This is a counter-suit to one brought against Jay Gould, Russell Sage and the Missouri Pacific.

Louisville & Nashville.—The company reports the earnings and expenses for the year as follows:

Year to June 30, 1890-91:	1890-91.	1889-90.	Inc. or dec.
Gross earnings	\$19,205,262	\$18,846,904	I. \$359,258
Oper. expenses	12,205,355	11,119,082	I. 786,263
Net earn.	\$6,999,907	\$7,426,912	D. \$427,005
Fixed charges	4,618,946	4,922,414	D. 303,468
Balance	\$2,380,901	\$2,514,493	D. \$124,437
Other inc.	628,849	636,686	D. 9,837
Total	\$2,909,810	\$3,11,184	D. \$123,374
Loss leases	127,470	276,542	D. 149,072
Balance	\$2,882,340	\$2,866,642	L. \$15,698
Dividends	2,400,000	2,405,367	D. 5,367
Surplus	\$182,340	\$461,275	I. \$21,065

The Georgia road for the first time shows a profit, \$62,550. The loss on Pensacola and Atlantic was \$190,000. The directors offer stockholders of record on July 21 the privilege of taking \$1,800,000 of the \$7,000,000 new stock authorized on July 4 at 70c. They have declared a cash dividend of 2½ per cent., payable Aug. 4.

Louisville, St. Louis & Texas.—At a recent meeting of the directors at Louisville it was voted to formally

absorb the Louisville, Hardinsburg & Western. The latter road was built as a branch of the former from Irvington, on its main line, southwest to Fordsville, Ky., a distance of 40 miles. Recently the line has been operated by the officers of the former road, and the action just taken is only a formal ratification.

Richmond & Danville.—The \$2,000,000 mortgage of the company recently recorded in Virginia is a new bond. It is an equipment bond running for 15 years and bears six per cent. interest. It has a sinking-fund clause providing for its retirement in 15 years. The bond is for equipment already purchased and to be purchased. The issue was authorized at a meeting of stockholders June 20, 1891. The bonds have not yet been issued, but a few of them are now being prepared for issue.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, July 15, 1891.

Passenger matters are at a stand-still waiting for the action of the meeting of the Western Passenger Association, which has been called for to-morrow. The managers met July 11 to consider the status of the Alton in the association. There was a full representation, including the Alton, and the forenoon was devoted to a discussion of the situation and a statement by the representative of the Alton. The Rock Island and Chicago, St. Paul & Kansas City supported the Alton, but the other lines defended and supported the Chairman. A resolution was offered supporting the Chairman, but the Chair ruled it out of order on the ground that no appeal had been taken from his ruling.

Lake rates are reported firm and vessel owners are not inclined to take contracts ahead.

Word has been received here that the Soo line has cut the rate on wool from 78 to 58 cents per 100 lbs. and flour from 37½ to 30 cents from St. Paul and Minneapolis to Boston.

The Commissioners of the Western Traffic Association heard a large number of appeals July 10, but announced no decisions, as they were in session until a late hour on Saturday preparing matters for submission to the Advisory Board at the meeting this week. Chairman Walker and Commissioner Midgley left for New York on Sunday to attend the meeting.

The "Monon" and Chicago & Eastern Illinois have again placed tickets in the hotel offices.

The Illinois Central has agreed to reduce the switching charge 25 per cent. on local business for the World's Fair, making a rate of \$1.50 per 1,000 lbs. On business from connecting lines the usual rate of \$5 per car will be charged.

C. H. Mitchell, a ticket broker, has been arrested on a charge of embezzlement sworn out by A. W. Johnson, an agent of the Western Passenger Association. Johnson in the performance of his duties testing the market purchased a round-trip ticket of Mitchell for Denver, over the Chicago & Alton, for \$48, with a rebate of \$24 on the Denver office. Before the ticket was delivered Mitchell became suspicious and refused to either deliver the ticket or refund the money unless Johnson would make affidavit that he was a bona fide passenger.

Commissioner Charles E. Fulton, of the Chicago & Ohio River Traffic Association, has issued a circular announcing a reduction in the rate which will be allowed by lines in that association on private refrigerator cars from one cent to three-fourths of a cent per mile.

Traffic Notes.

The Missouri Railroad Commissioners have reduced rates on wheat from Missouri points to St. Louis from one cent to two cents per 100 lbs., according to the varying conditions governing.

The Railroad Commissioners of Kansas find that the five principal roads of that state, which carried seed grain and other supplies free to destitute farmers last winter, handled traffic which in the aggregate would have been charged \$20,157 at regular rates.

The annual meeting of the Southern Railway and Steamship Association was held in New York City last week, General E. P. Alexander presiding, in the absence of Senator Brown, President of the Association. A general revision of the agreement was discussed, but nothing was decided upon, and another meeting will be held in August.

All freight rates from New England westward, except those by the direct all-rail routes, have been considerably unsettled ever since the opening of navigation, especially those on some of the principal commodities. A meeting was held in New York last week to consider the demoralization, and it is said that the lines doing business in connection with Lake Erie boat lines agreed to restore rates July 24 to the basis of 54 cents first-class Boston to Chicago. There seems, however, to be some doubt about the final restoration of tariffs.

The Lake Shore & Michigan Southern has resumed the sale of unlimited tickets to points on foreign roads, after adhering for several months to the regulation adopted by the Central Traffic lines which was intended to abolish all unlimited foreign tickets. It is said that the competition of Canadian roads, which would not join in the agreement, was the cause of this action.

East-Bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending July 9 amounted to 54,359 tons, against 31,692 tons during the preceding week, an increase of 22,667 tons. The proportions carried by each road were:

	Wk. to July 9.			Wk. to June 30.	
	Tons.	P. c.	Tons.	P. c.	
Michigan Central	5,716	10.5	2,200	7.0	
Wabash	3,759	6.9	1,082	6.6	
Lake Shore & Michigan South	8,174	15.0	4,511	14.2	
Pitts., Ft. Wayne & Chicago	5,437	10.0	4,349	13.7	
Pitts., Cin., Chicago & St. L	5,819	10.7	3,676	11.6	
Baltimore & Ohio	3,054	6.7	2,459	7.7	
Chicago & Grand Trunk	5,638	10.4	3,037	9.6	
New York, Chic. & St. Louis	6,031	11.1	3,078	9.7	
Chicago & Erie	10,131	18.7	6,300	19.9	
Total	54,359	100.0	31,692	100.0	

Of the above shipments, 1,834 tons were flour, 14,712 tons grain, 2,223 tons millstuff, 6,881 tons cured meats, 9,713 tons dressed beef, 2,969 tons butter, 1,870 tons hides and 7,872 tons lumber. The three Vanderbilt lines carried together 36.6 per cent., while the two Pennsylvania lines carried but 20.7.